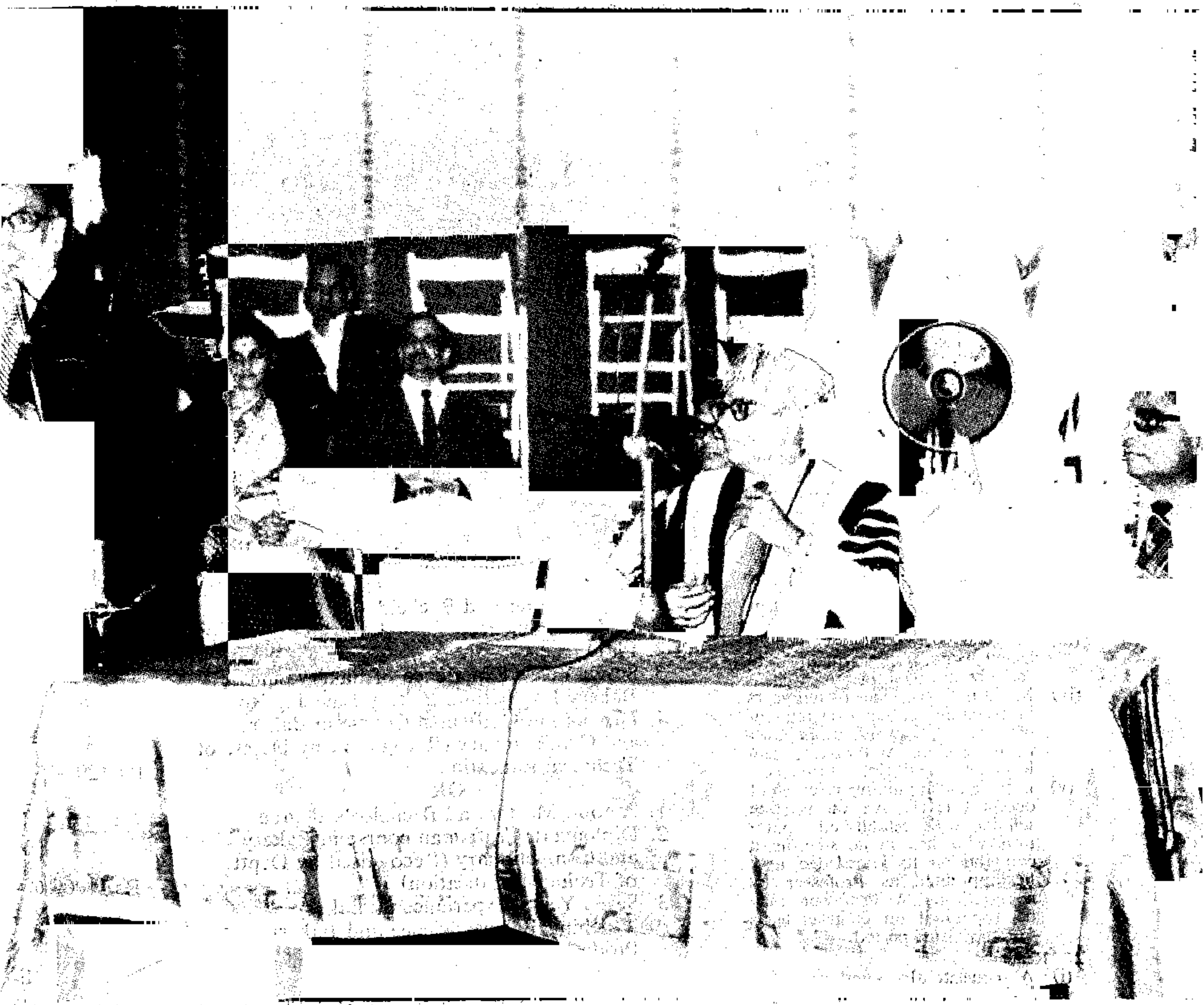
University News

A FORTNIGHTLY CHRONICLE OF HIGHER EDUCATION & RESEARCH MAY 1, 1980



Professor M.G.K. Menon, Secretary, Department of Science & Technology, Government of India, delivering the Convocation Address at the Bombay University.

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AIU brings out status reports 250
Kashmir to amend Universities Legislation 250
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Theses of the Month 254
Current Documentation in Education 255
Classified Advertisements 256

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Editor : ANJNI KUMAR

Significance of Non-formal Education

S. C. Dube*

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(Continued on page 242)

** Vice-Chancellor, University of Jammu.*

SAMBALPUR UNIVERSITY

JYOTI VIHAR : BURLA

Advertisement No. 5851 Estt. II
Dated 5-4-80.

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University Post Graduate Departments

1.	English	—Professor	– One Post
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5.	Mathematics	—Reader	—One Post
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L.R. Law College : Sambalpur

7.	Reader		—One Post

I. Scales of Pay:

1. **Professor**—1500-60-1800-100-2000-125 2-2500/-

2. **Reader**—1200-50-1300-60-1900 -

All the posts carry dearness allowance and C.P.F.=cum Gratuity benefits as prescribed by the University from time to time.

II. The age of retirement is sixty years.

III. Qualification

1. Professor

(i) A consistently good academic record with first or high second class Master's Degree in the concerned subject or equivalent foreign degree with Grade B+ or 55 % marks which may be relaxed in the case of candidates otherwise found suitable.

(ii) Good academic record with a Doctorate Degree or equivalent published work.

(iii) An eminent scholar with published work of high quality and actively engaged in research.

(iv) Minimum experience of ten years in teaching and/or research out of which at least five years must be in teaching at Post-Graduate level as a full time teacher.

(v) Experience in guiding research at doctoral level. An outstanding scholar with established reputation who has made significant contribution to knowledge may be appointed as Professor by negotiation. A Professor may be appointed on contract basis for a specified period.

2. Reader

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(ii) Good academic record with a Doctorate Degree or equivalent published work.

(ii) Evidence of active participation in research.

(iv) Eight year's experience of teaching and/or research out of which at least five years shall be as Lecturer in the Unversity P. G. Departments/College at Honours/ P.G. level.

Reader in Law

(i) A Master's Degree in Law.

(ii) Five year's teaching, research and/or professional experience out of which three years must be in teaching law in a Law College.

Desirable

Doctorate degree in. Law or equivalent published work of high standard.

IV. SPECIALISATION

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Comparative literature, preferably English-Oriya and ancient Greek and ancient Sanskrit/Linguistic-Teaching of English.

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Ancient Indian History and Archaeology and Regional History.

Professor in Statistics

Inference/Stochastic process/Operation Research/Information Theory/ Probability Theory/Sampling Theory/ Design of experiments.

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Dated 14-4-1980 **REGISTRAR**

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University Research and National Development in India

R. C. Paul*

Introduction : A sustained and continuously growing research effort is the inevitable corollary of the world of sweeping changes and on-rushing obsolescence that Science and Technology have introduced. In a world where science and activities related to it are doubling in ten to fifteen years, where, it is said, a scientific paper is out of date before it is printed, a book is out-dated by the time a student completes his course, where a graduate is absolescent on the day of his graduation, where technology applying it follows on the heels of the basic discovery much sooner than it even did before, no nation can remain, in the close-knit world of today, unaffected by and indifferent to these vast changes. For there are only two options : to meet the challenge and rise on the crest of the wave or be swept over by it. There is no third option. Like inexorable fate change moves on, with an ever-increasing acceleration, and there is really no choice for a nation except to strain every nerve to meet its challenge. Again, research itself increase the need for more research. Not only does it open up new vistas which need to be explored, but technology also disturbs the delicate and complex balance of nature with the result that one problem solved throws up a hundred more problems to be solved.

The challenge of change, again, is comprehensive. For while the driving force of this change is Science and Technology, their impact is total, both on the natural and social environment. As the Education Commission of 1964-66 pointed out, while their impact on the material environment is great, there impact on culture is even more profound. And it goes on to say : "Nothing comparable to the scientific revolution in its impact on man's development and outlook has happened since the neolithtc times." One could add that the comprehensive nature of the impact of science and technology has been generally ignored leading to distortions and mal-adjustments which have endangered the very survival of the human race itself. It is this realisation that has led to the emergence of the science of Technical Assessment (TA) which tries to judge the total social and environmental impact of a technology before its final adoption.

This comprehensive challenge can be met only by a comprehensive research effort by our top intellectuals in Science and Technology, Social Sciences and the Humanities so that material growth takes place within the framework of our overall societal goals and distortions are avoided. The universities, representing as they do the apex of our educational system and all the disciplines, are most favourably placed for this comprehensive and inter-disciplinary research effort. The universities, however, are a part—though a most essential and significant part—of a much vaster infra-structure, which has been created in many countries for purposes of a quicker response to immediate and specific problems—much quicker than universities by themselves can give, because of their structure, primary concern with fundamentals etc. Therefore, research in universities can best be studied when they are viewed as an integral part of the total R & D infra-structure in the country, with the other parts of which they have to vigorously interact.

R & D is the name of organised and systematic effort for increasing productivity and introducing technical innovations. The R & D chain is a long but integrated one and consists of basic oriented research, applied research and design and development. The first aims at increasing scientific knowledge in known fields or discovering new fields of investigation which seem to have significance and potential for application in R & D. In applied research the objective is to discover knowledge which would have specific, practical application in R & D. Design and development is the application of the results of basic and applied research and of empirical knowledge to introduce new materials, products devices, processes and methods for improving existing ones including the development of prototypes and pilot plants. This is technical R & D and has to be combined with business R & D to produce results. The latter consists of transferring the technology developed to the economy and marketing the innovation. Coupling the technical R & D with the business R & D and getting the feed-back from the latter really completes the R & D chain. While these distinctions broadly differentiate the different stages in the R & D chain, they are by no means as sharp as they were a few decades ago. As the Education Commission points out, in some fields hardly any distinction exists between basic and applied research and between research and development. "In fact", continues the Commission, "the great strength of contemporary science lies in the close interaction and mingling of applied and basic sciences.

R & D Imperatives of Development Goals : R & D is the most effective tool for development. As Stevan Dedijer has shown, there is a close relationship between GNP and the expenditure on R & D. To be effective, R & D has to be closely linked, both in its areas of choice and its strategies, with the socio-economic development goals of a nation. The Indian goals are embodied in the Indian Constitution and spelt out in her development plans. They may be summed up as Democratic Socialism. It implies increased production, equitable distribution and involvement, as full as possible, of the people. In the context of India's poverty and unemployment, it becomes essential to meet the minimum needs of the people and provide employment, which can only be done in the context of development of the rural areas, where 70 per cent of the people live. There is then the challenge of excellence in this highly competitive world and the problem of security where no amount of import technology can be of adequate help. The problems needing utmost attention, therefore, may be summed up as welfare, growth and security.

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*Vice-Chancellor, Punjab University, Chandigarh.

In response to these challenges the "twin objectives of the S & T Policy", says the Draft Five Year Plan 1978-83," will be: (a) to secure for the people of the country, particularly those in the rural areas, all the benefits that can accrue from the acquisition and application of scientific knowledge and research, to remove unemployment and fulfil their basic needs, to enhance the quality of their life, and to enable them to realise their full human potential and (b) to improve the quality and expand the quantity of the S & T effort, and harness the S & T capability for enhancing self-reliance.

In regard to the basic minimum needs, while it is largely, with certain adaptations, the use of existing knowledge, calling more for socio-political and administrative decisions and organisation than for R & D, that will be required, "new knowledge is certainly necessary in such areas as new varieties of seeds, nitrogen-fixation through biological or chemical methods, biological control of pests, photosynthesis, new uses for various local plants and other materials, re-cycling of waste products, new sources of energy, especially those suited for decentralized exploitation, new materials, improvement in the productivity of soils, better understanding of parasitic diseases, fertility control etc. In these broad areas specific and tasks of critical importance should be identified so that the results of the R & D effort can be maximised. In a panel discussion of scientists, drawn from front-line fields of science and technology in India, reported in The Hindu of September 27, 1979, some of these areas, which had been neglected, were identified; cashew-yield, sandalwood virus, thatch (which is used by millions of our people as roofing material), coconut fibre etc. A greater understanding was needed to tropical biology and soil biology to get four crops a year instead of double cropping, which we have already achieved. Agriculture was the best converter of solar energy and the problem needed our concentrated attention. Problems of the exploitation of our water resources—both sea and inland, or semi-arid zone and rocky soils also need concentrated R & D effort. Agriculture—along with some other areas like health, coal mining, fertilizers and pestisides, oil exploration and exploitation etc.—constitutes a sector of the economy where the very size of operations calls for substantial R & D inputs, which can also become cost-effective. Then there are high technology areas like atomic energy, space, defence, electronics and telecommunications where self-reliance has become increasingly important. Not only is the latest technology in these fields not always available, pre-occupation with high technology also serves to build up the confidence of our scientists and has other spin-offs. So we have three types of areas where R & D effort needs to be concentrated, the area of minimum needs, the area where the scale of operations is very large and certain high technology areas where either our security is involved or where it is necessary for us to strive to keep in the frontline of research. There are some other areas, especially those in which knowledge and techniques are developing very fast, where we need to build our capability to take wise decisions while importing technology or equipment.

As regards the *strategy* of R & D, dependence on outside technology should be minimal. Firstly, because if we depend upon borrowed technology, we will be perpetually behind others. For the technology that other countries sell is or is about to be obsolete. Secondly, because decentralised development, which we have opted for, and the optimal use of our own resources will require our developing our own technology. Thirdly, this will build up the self-confidence of our scientists and technologists and accelerate their development. Fourthly, it saves us from dependence on other countries for spares. It is estimated that even if a country gives us a plane free, the components which we will have to buy during the life of the plane, will cost us four times the cost of the plane. Fifthly, it saves us from the vagaries of international aid and trade relations. This self-reliance, however, need not rule out the import of technology in those sophisticated and high priority areas where Indian Science and Technology is not yet adequately developed. In such cases the best and most appropriate technology ought to be bought out-right and then adapted and improved upon to suit our own conditions and infra-structure. That pre-supposes that one has built up the necessary capability for choosing the right technology and assimilating it. Japan did it so well that it exported the improved technology. This would also require the association of the indigenous R & D laboratories and design engineering agencies to be associated with the import of technology. Further, firms, says the Draft Five Year Plan 1978-83, which are allowed to import foreign technology will be required to set up the R & D facilities necessary for its adaptation, assimilation and improvement. Any technology to be imported should further be subjected to Technology Assessment or the assessment of its total impact on our social and natural environment. As far as possible, the products and the inputs of the technological process should be part of the degradable biological cycle. In certain areas while one laboratory or industry does not have the total technological capability, but it is scattered over a number of institutions and organisations, then an attempt must be made to weave them into a system to develop the national capability.

Another task of R & D is to ensure that the technology that we develop or the technology that we borrow must be appropriate. That need not mean that it should be simple or sophisticated. It only means that it is within the adoption and appropriation capability of the user. Appropriate, therefore, is a changing and evolving concept. What is appropriate today may not be appropriate tomorrow, what is appropriate for one sort of clientele may not be appropriate for another type of clientele. Technology to be appropriate must not forget its impact on man—if man—power is abundant, it must not displace labour, if decentralisation is essential for human welfare in a particular context it must not destroy decentralisation etc. Einstein admonished the scientists in one of the big laboratories: "Concern for man himself and his fate must always form the chief interest of all technical endeavours. Never forget this among your diagrams and equations." Further, technology to be economical—and what can be more appropriate in a poor country than economy—one must study intensively our own technologies on the one hand and "leap-frog" to future technologies on the other. Our scientists have the tendency to reject out of hand what is indigenous. We must not forget that they have the sanction of the permanence of centuries behind them and there must be something significant underlying them which must be studied and can be appropriated at no cost. But for that one must go to the villages and talk to the villagers who use that technology to gain insights, which cannot be gained through government reports. The OXFAM report on Andhra cyclone declares that the roofing that was used traditionally was very good for standing against cyclones. Dr. Ramaseshan, in the panel discussion already referred to, considered it worth while studying the structure that had developed over the centuries. In another panel discussion, again organised by The Hindu, Dr. Y. Nayudamma gave his experience in the Central Leather Research Institute:

> "......take a simple thing like doing the unhairing process. The books on the chemical process will say so much time is needed. But Indian tanners probably one thousand years ago discovered a process which will do it in three hours. We studied, we found that it was enzymatic process and a student has got a Ph.D. Similarly they say that for every pound of leather they require a thousand pounds of water. We know that Gujarat and Rajasthan do not have that much of water. One researcher studied how they do it there and produce the leather and he got a Ph.D. too."

"They got international recognition from the top." And Nayudamma's advice is, which needs all our attention: "We should weave modern methods and tools into the traditional tapestry." The wisdom and beauty of the traditional tapestry need not be doubted if we remember that, as Dr. A.R. Vasudeva Murthy said:

> "India was considered to be the industrial workshop of the world till about the 18th century. Indian technology was far ahead of the European technology in the fields of textile, chemistry, medicine, metallurgy and so on. The achievements in the fields of mathematics and astronomy were vey well established. The best steel that was produced was in India till the middle of the nineteenth century when the Bessemer process came into popularity."

As regards "leap-frogging", in view of the emerging science of forecasting which enables one to forecast with a fair amount of certainty the technology which will appear ten to twenty years from now, it is possible to avoid the expense of the infrastructure of the intermediate stage through which the developed world passed. The heavy investment made therein acts as an obstacle to the developed world to move as fast as they could by adopting the latest technology. Leap-frogging, however, requires a very efficient information system: data banks; efficiently organised conferences and workshops; better, fuller and more easily available reports of these conferences etc. The DST has made some beginnings in this direction. The areas for developing futureistic technology will, however, need to be carefully identified because we should have the financial and technical capability for creating the necessary infra-structure. Some areas in which Dr. Iyenger in The Hindu panel discussion on Technology Assessment felt we could leap-frog were: the adoption of satelite television instead of passing through the city television stations stage in the U.S.A. The putting of optical fibres instead of copper conductors in the telephone system as a result of which its efficiency would increase tremendously—"the number of lines—the amount of information we can transmit and the fastness;" etc. In regard to the telephone, the U.S.A. had the technical capability but it did not want to disturb its present, highly efficient telephone net-work.

Another strategy that our R & D effort will need to adopt is greater interaction between science and technology. For it is only new science that can create new technology.

To increase the efficiency of the R & D chain, the in-house R & D in industry needs to be considerably enlarged. That will make the transfer of the R & D work done in the laboratories to the production line much easier. Today not more than 10 to 15 per cent of the laboratory innovations are adopted by industry. Moving young engineers, especially immediately after Ph.D. to other jobs in the industry and encouraging the mobility of scientists between industry and institutions will also improve the technology delivery system. The problem of risk coverage when a new innovation is taken up in preference to proven technology—which is often imported—will have to be sympathetically considered by Government. The existing effort already made in this direction will need to be considerably enlarged. When it is a question of transferring technology to the unorganised sector or the people, the social scientists must be associated, who can look after the social engineering part and see whether the social culture accepts it and has the capacity to absorb it. To create a culture for science and technology, the education system, including adult education, should create a scientific temper, a scientific way of thinking, among the people and develop their problem-solving capabilities.

Top-most priority, however, ought to be given to build up the self-confidence of the R & D men, develop their social conscience and sense of social responsibility. The lack of self-confidence of our young scientists was noted by almost all the senior scientists who participated in the panel discussion on Technology Assessment, already referred to. Dr. Ramaseshan said that while there was no dearth of talent in our young scientists, whenever they took up a problem, though they came near to a solution, they were never able to finish the job for lack of grit, dedication and self-confidence. Dr. Rohatgi said that at the CSIR Regional Laboratory at Trivandrum they ran delphi questionaires in their studies to anticipate technologies. There was not a single instance that the Indian respondents felt that they would have a technology developed in India before the West did so. They look for recognition from Western Scientists, they take up problems that they work on, they publish their articles in Western journals etc. They forget that they had a built-in advantage in looking at their own environment and also had responsibility to their own people. The senior scientists will have to set the fashion and convince the younger scientists that they could rise to their heights and win international recognition by being themselves. Their movement all along the R & D chain and seeing laboratories themselves, as many of them do today, will also increase their self-confidence. Much greater investment in R & D within the public and private sectors is called for to create a climate for successful adventure which creates self-confidence. Another thing that Indian scientists need to learn is team work, which is indispensable for modern technology.

Perhaps the most important factor in drawing the best talent in the country to R & D and getting the best out of them is the salaries and service conditions. At the instance of the Department of Science and Technology (DST), the Institute of Applied Manpower Research studied the development of R & D personnel. For the purpose, they divided the area of R & D into the Institutional Sector, the Industrial Sector and the Universities. Of these most of the hard core of R & D is done in the Institutional Sector—comprising of the National Laboratories of the CSIR, BARC etc.—which also provides the highest salaries and most favourable conditions. "Out of 23,701 S & T personnel covered, only nine persons were placed in salary scales starting about Rs 2,500 and as few as 103 persons are placed in the salary scales starting between Rs. 2,250/- and Rs. 2,500/-. Moreover, all the nine toppers and 98 out of the 103 in the next lower slab were engaged in administrative work. So for persons engaged full-time in R & D work, the apex for all practical purposes lay below Rs. 2,250/-. Moreover, very few out of the lowest and middle levels could expect to reach the apex." "This shows", concludes the report, "that R & D is certainly not one of the most lucrative professions in the country." The poor prospectus for promotion limits the scope of "both intellectual and career development of the young, promising scientists which ultimately reduces their productivity." In this connection it may be mentioned that the alumni of the Indian Institute of Technology which were set up to produce a cadre of high level scientists and technologists for R & D work were not attracted towards it. A recent survey of the Bombay IIT alumni showed that not more than 30% of these were employed in R & D work. If their migration is also taken into account, the percentage would be still smaller.

Available Infra-structure and Position and Role of Universities therein: The well-established scientific and technological superiority of India was steadily eroded by political subjugation and the on-slaught of cheap machine-made goods. The period of modern scientific research began with the setting up of the three universities at Calcutta, Bombay and Madras in 1857 which produced a few top-ranking scientists like Prof. C. V. Raman and Prof. J. C. Bose. Their tradition was carried on by other eminent scientists like Acharya P. C. Ray, Prof. Megh Nad Saha, Prof. S. H. Bose and others. Their pre-occupation, however, was mostly fundamental research.

The foreign rulers naturally did not encourage the development of indigenous technological capability and whatever industrialisation there was depended on borrowed technology till they were forced by World War II and the cutting off of the supplies from Europe, to develope India as a supply base for the War effort in the East. The Board of Scientific and Industrial Research was set up in 1940 and the Council of Scientific and Industrial Research in 1942. "Much useful work was done under the auspices of these two bodies during the war. It was, however, only after Independence that serious efforts were made to develop India's R & D. The role of R & D in national development was recognised by the setting up of the Ministry of Scientific and Industrial Research in 1948. The powerful Nehru Bhatnagar combine began with a bang and set up a chain of National Laboratories to develop the products and industrial processes, fully exploiting India's indigenous resources to produce maximum self-reliance and to put India on the Industrial map of the world. Research in these laboratories and other research Institutions would especially help the small-scale and cottage industries which could not set up their own R & D. Post-graduate education and research expanded very fast. The next major step was the formulation by Parliament of the Scientific Policy Resolution in 1958, which emphasised that the key to national prosperity lay in the effective contribution of three factors: technology, raw materials and capital of which the first was perhaps the most important. The policy resolution gave a further kick to the R & D effort as may be seen from the following table regarding the increase in expenditure and the scientific and technical manpower:

TABLE 1

Annual Growth Rate of R & D Expenditure and Scientific and Technical Manpower

Item	Annual Growth Rate of R & D Expenditure and Manpower									
	1958-59		1968-69		1969-70		1970-71		1971-72	
	T	GR	T	GR*	T	GR	T	GR	T	GR
Expenditure (Rs. Crores)	22.93	—	107.56	36.9%	116.62	8.4%	139.64	19.7%	151.64	8.6%
Scientific Technical Manpower	20,724	—	73.634	25.5%	87,613	19.3%	94,686	8.1%	103,767	9.6%

T: Total, GR: Growth Rate

*Annual Average Growth Rate for the period 1958-59 to 1968-69.

Source: Scientific and Technical Manpower for Research and Development (Report 1; Institutional Sector) op cit-, p. 2.

The Draft Five-Year Plan 1978-83 estimated that there were at that time about 900 research institutions, including universities, under the Central and State Governments and the private sector. The expenditure on Science and Technology (S & T) was about Rs. 400 crores, which was about 0.6% of the GNP. The stock of S & T manpower had been growing at the rate of about 9 per cent per year for over 20 years and was estimated to be about 2 million, giving India the third largest complement of qualified S & T manpower in the world, next only to the USSR and the USA. The net effect has been to put India among the industrialised countries of the world.

In spite of all this effort for R & D, Indian industry has still largely continued to depend on imported technology and there has been very little effort and success in weaving together the R & D capabilities of different agencies to create a system of R & D. The first major effort in this regard was the setting up of the Department of Science and Technology (DST) and the National Committee on Science and Technology (NCST) in 1971. The aim was to develop an S & T Plan interwoven with the socio-economic Five Year Plan. The NCST worked largely through panels of scientists and technologists, economists, administrators and other skilled groups drawn from research laboratories, universities design engineering and manufacturing units, natural resources survey agencies etc. The S & T Plan (1974-79) was brought out in 1974 and identified the S & T tasks that needed to be accomplished. The process of enmeshing them with the Plans of the various Ministries, however, began about the middle of the Fifth Plan when the Planning Commission started discussion about the S & T component of each Ministry/Department's plan with the participation of the CSIR, the DST, the DGTD, Department of Electronics etc. As a result of these exercises the awareness of the importance of S & T tasks has sharpened in the Ministries and separate budget heads and allocations provided which makes it possible to monitor and evaluate the S & T Plan. Special Committee on Implementation of Projects (SCIP) have been set up in the different Ministries. The process is being strengthened and streamlined in the Five Year Plan (1978-83) by creating a small but well equipped nodal point in each Ministry—"a small professional information planning and analysis group"—to lend technical support to the SCIP. It will be the task of this group, in cooperation with the NCST and the Planning Commission, to identify the S & T tasks for improvement of products/services in the sector as well as the institutions (National Laboratories, Universities, IITs etc.) where the capability to help the sector exists and assign them well-defined tasks, as well as make the capability of the sector itself at various points known to others within the sector and outside etc.

The infra-structure for S & T (including R & D) that has now been identified in the country and the various parts of which are being woven into a system may be summed up as follows:

(1) The Department of Science and Technology plays an important role in initiating a number of research programmes in the multi-disciplinary and new emerging areas, and coordinates and formulates programmes of regional relevance which are implemented by a number of organisations. Thus primarily it has been promoting and accelerating inter-disciplinary, multi-institutional research and has been the nodal agency for international cooperation in the field of science and technology with several countries. Besides, it is promoting the utilisation of indigenous technology. It has two apex bodies: the National Committee on Science and Technology to formulate, monitor and modify where found necessary, the S & T Plan, in cooperation with the Planning Commission, and the National Committee on Environmental Planning and Coordination (NCEPC) for identification and investigation of the problems of preserving and improving environment in the country. It manages a number of institutions including the National Information System for Science and Technology (NISSAT). It also plays a catalytic role in promoting S & T activities in the various Ministries.

The Department also deals with the CSIR

(Council for Scientific and Industrial Research) with its many National Laboratories, which have developed more than 1000 processes of which 400 have gone into commercial production, the total production of which is over rupees 400 crores a year. The laboratories, however, need to develop a nuclear design and engineering capability so that they can interact with design and engineering companies/ organisations to scale up the operation to the pilot plant stage and then to the commercial manufacture stage at which prototype plants will need to be set up, when government agencies and commercial manufacturers should be fully involved so as to facilitate the transfer of the innovation to the economy.

(2) Other Central Governmental Ministries/ Departments/Agencies which have their own in-house R & D institutions.

(3) At the State level R & D committees have been set up in many States under the joint auspices of the Ministry of Industrial Development and the Department of Science and Technology. They assist the Small Industries Development Services Institutes (SISI) set up by the Small Industries Development Organisation (SIDO) by accepting from them the problems of small industries and referring them to the National Laboratories, engineering colleges etc. for solution.

(4) R & D in industry. In house, RDD is not only the most efficient and relevant form of RDD for industry, it is also essential for taking full advantage of the RDD effort of the National Laboratories and institutions of higher learning. That is why in developed countries the relevant RDD is done largely by the industry itself. Various measures are being taken to induce the private sector to step up its in-house RDD effort. This effort is also being stepped up in the public sector, where the large size of the enterprises, their technological complexity and potential growth offer exceptional opportunities for RDD development.

(5) Universities, IITs, Regional Engineering Colleges and other institutions of higher learning like the Indian Institute of Science, Bangalore. There are two types of universities. Firstly, there are those in which all disciplines are represented and given practically equal importance. Their strength lies in their multi-disciplinary capability. Their main pre-occupation is with basic sciences, social sciences and humanities. They may be called general universities. Secondly, there are professional universities like the Agricultural Universities, the Technical Universities (including the IITs), and the Medical Universities under the name of All India Institute of Medical Sciences etc. In the case of the professional universities, their role in applied research is well cut-out though they must have grounding in basic sciences and humanities. Basic science is at the root of applied science, whereas humanities enable a professional to realise that he is part of society and has certain responsibilities towards it. Research in basic sciences in professional universities, however, ought to be oriented towards the special profession for which the university concerned has been set up. It is in regard to the general universities that doubts and controversies arise. Their role and functions as regards R & D may be briefly summed up as follows:

(1) To create a cadre for R & D work—persons imbued with the scientific spirit of enquiry, with a problem-solving urge, full of confidence, dedication and determination, and fully aware of their social responsibilities. This they can do through an atmosphere of research pervading all teaching and through the teachers sent out reaching the schools and the colleges, where they can identify talent at an early age and encourage it to develop. The presence of a great scientist on a university campus will have a "multiplier effect" far more wide-spread than anywhere else. That is why in most countries the greatest scientists are in the universities, and, therefore, the development of research Institutions and laboratories, which have attracted talent away from the universities, has not been in the national interest. Two steps need to be taken to undo the damage done. Firstly, closest possible links should be established between these institutions and the universities by encouraging the mobility of Scientists between the two. Secondly, new institutions should not be opened outside the university system unless there are very strong reasons for doing so. The university structures should, however, be re-examined to provide for separate institutes within the system where necessary. Other steps which universities can intensify is to improve the quality of student-teacher societies through the presence of able researchers-teachers.

(2) To give grounding in research methodology and in basic or fundamental research. Fundamental research has been the occupation of the universities for centuries. In our impatience at the slow pace of basic research and its generally unidentifiable goal as well as the presence of pressing needs against scarce resources, we sometimes tend to decry pre-occupation of the universities with fundamental research. But fundamental or basic research is the mother of applied research and hence essential. Moreover, the effects of basic research though delayed are epoch-making. While the objectives of applied science is limited and specific that of basic science, while being vague, are very wide-ranging in their effect. As basic research looks for laws behind phenomenon, when it succeeds it solves not only one problem like applied science but many problems. The effect is tremendous. As L.J. Thompson said long ago, while applied science leads to reforms, basic science leads to revolution. Moreover, as there is no other place where basic research can be pursued, it is the primary function of the universities to pursue it. As basic science is international it poses a serious challenge to the researcher and calls for rare dedication and creativity which has a very important contribution to make in creating an atmosphere of excellence and high endeavour. Through their pre-occupation with fundamental science which creates technology the universities contribution to R & D must be fully recognised. This pre-occupation with

fundamental research, however, need not mean shutting ourselves up from our own environmental problems. Prof. Raman created international science, excited by the blue of the waters near him and the blue of the skies above. Louis Oasteur, the father of micro-biology, developed its principles while he was trying to solve the problems of wine-making and disease of the slick-worm. Another point which is often forgotten is that compared to technology basic science is very inexpensive.

(3) During the last 50 years or so the universities have slowly moved into the area of R & D or that part of research which is directly concerned with technological development or is aimed at marketing technological innovation. The practice, however, has not become very common except in countries like the USSR, the USA, Japan and West Germany. Here a major part of the university research programmes are financed by the industry/Government for specific development objectives. The USSR adopted this approach after the October Revolution and it resulted in spectacular development of Soviet technology, especially after the Second World War, culminating in the sending up of Sputnik I into space in October, 1957. That shock the complacence of the USA, which feverishly set about restructuring its R & D infrastructure to catch up with the Soviets. One of the measures was the radical reform of their higher education system to make it more socially relevant, with special emphasis on technological development.

In India, this role of the universities has been realised and was evidenced by the R & D work in the IITs, Regional Engineering Colleges and the Centres of Advanced Study in the universities. Much of this research was funded by the user agencies like the CSIR, the Atomic Energy Commission etc. This trend was reinforced with the setting up of the NCST. The Draft Five-Year Plan makes a modest move in this direction:

> "While the concentration of effort in universities will continue to be on basic sciences, it will be useful for university teams (as for teams in other laboratories) to take up some goal-oriented, time-bound projects so as to enhance the sense of purpose and time and cost consciousness within the scientific academic system."

This trend is likely to be strengthened as the universities improve their capability and the demands of the S & T Plan increase. For theoretically the universities are ideally suited for multi-disciplinary activity involving team-work as most scientific and technological research today is.

(4) As a part of their participation in the R & D chain of activities the universities will have to increase their consultancy services to industry, with which they will need to increasingly interact, and extension services to the community where the R & D relates to agriculture and cottage industries. The Agricultural Universities have already forged close links between education, Research and Extension. The medical colleges and institutes have to be closely linked with the community to collect the data required for their research and extend the benefits of their research to the beneficiaries. The University Grants Commission not accords as much credit to extension as to research.

(5) The universities being multi-disciplinary have a great advantage in preparing cadres for Technology Assessment (TA), which is becoming increasingly important and is the science of the future. The post graduate and research students in various disciplines, including the Social Sciences and Humanities, will need to be constituted into inter-disciplinary teams and exposed to the techniques of TA and their capabilities developed for assessing the impact of technologies. They will thereafter be able to participate in teams that may be set up for this work.

(6) The universities have an important part to play in assisting Government to formulate Science policy and programme including those relating to import and export of technology, international collaboration etc.

To discharge their functions mentioned above with any degree of efficiency the universities will have to interact with the other parts of the infrastructure: the NCST, the National Laboratories, ISRO, Atomic Energy Commission etc. as well as improve their general sense of responsibility towards development. The agencies that will be responsible for giving the necessary impetus in the desired direction are the University Grants Commission for the General Universities, the Indian Council for Agricultural Research for Agricultural Universities and the Indian Council of Medical Research for medical institutions.

Universities—Present Position and Future Needs

The research in universities (including the IITs and other institutions of higher learning) may be dealt with under three broad heads: (1) Research in science and technology, social sciences and humanities being conducted in universities and institutions of higher learning, being guided and assisted by the University Grants Commission (UGC), either by itself or in cooperation with other agencies / organisations like the ICSSR, ISRO, CSIR etc or directly by the Ministry of Education as in the case of IITs; (2) Agricultural research being conducted in agricultural universities being guided and assisted by the Indian Council for Agricultural Research; and (3) Medical research in colleges/institutes assisted and guided by the Indian Council for Medical Research (ICMR) or directly by the Ministry of Health as in the case of the All-India Institutes.

FIRST CATEGORY

Science and Technology

The most comprehensive and finally determining indicator of policies and programmes is the product thereof—the Ph.D. in this case. Their value is in turn determined by their utilisation pattern—whether they are employed and whether they are employed and paid according to their qualifications. The studies of the utilisation pattern of Scientific and Technical Manpower conducted by the Institute of Applied Manpower Research at the instance of the Department of Science and Technology as well as the study by Dr Barua of the DST indicate that the engineers in production earn much more than those engaged in research. Many take up post-graduate courses while waiting for jobs and give them up as soon as they get them. In the spectrum of scientific and technical man-power, the science Ph D.s are much worse off, because of their larger supply and poor quality—poor because the best students do not join science courses and prefer to join engineering, medicine, agriculture, commerce etc. and even among those who do join it is not the best who go up for research. In view of the shortage of jobs the better students take them up as soon as they find them especially as the prospectus for Ph. Ds are not very bright. Some of them are employed in the lowest salary scales in the R & D complex. The Barua-Gupta study estimates that "only 77,000 scientists against the stock of 2.43 lakhs are employed in the R & D and teaching institutions, including schools, where their qualifications may be gainfully utilised." Others are either unemployed or employed in jobs where their science qualifications are not utilised. The following table 2 taken from that study is revealing:

Study of the Institutional Sector (p-72) has a similar story to tell, it says:

> "..in research areas other than Atomic Energy, as many as 12.1% doctorate degree holders in agriculture/voterinary 5.7% doctorate degree holders in Engineering and Technology 12% post-graduate degree holders in Medical and Health Sciences and 11.1% doctorate degree holders in natural sciences are placed in the two lowest salary groups which, according to the revised salary scales, broadly correspond to salary scales for Technicians and Assistants. That means that more than 10% of the doctorate degree holders are occupying positions equivalent to those generally manned by undergraduate diploma holders or semi-professionals."

In private sector industries the position is much worse. 19.2% of Doctorate degree holders in Engineering and Technology and 35.1% of Doctorate and 61.0% of Master's degree holders in natural sciences are placed, in the lowest pay scale slab of Rs 425 and below, while only 16% of the bachelor degree holders in Engineering and Technology are placed in that scale. The study concludes that there was hardly any correlation between the earning and the level of educational qualification of the qualified S & T personal employed by the private sector. This raw deal to researchers and other highly qualified personnel cannot but adversely affect their morale.

In regard to the quality of our scientists, some of our top-most scientists and technologists in the country expressed themselves in two panel discussions arranged by The Hindu, already referred to. They felt that while we had the third largest force of QSEs (Qualified Scientists and Engineers), their number would be considerably reduced if we applied the test of a true scientist's urge for an capability of problem-solving. The majority of our S & T force is of middle, if not mediocre level. We have hardly made any significant contribution to international science during the last 30 years.

The present situation is most unfortunate because science and technology require a very large share of the most creative talent, especially for research in

TABLE-2

Career-path for Science Post-Graduates (M.Scs.) and Engineering & Technology Graduates (BE/B. Techs.)

Age	Science Research/Teaching	Engineering Research	Engineering Professional
21	Rs 400 Ph.D. Student	Rs 400 M. Tech. Student	Rs 700 Graduate Trainee in Public Sector
23	Rs 400 or Rs 500 Ph.D. student	Rs 600 Ph.D. student	Rs 1100 Assistant Engineer
25	Rs 600 Post-doctoral	Rs 600 Ph.D. student	Rs 1200 Assistant Engineer
29	Rs 1100 Scientist 'E' or Lecturer	Rs 1500 Scientist 'C'	Rs 1800 Executive Engineer
35	Rs 1500 Scientist 'C' or Lecturer	Rs 2000 or more Scientist 'E' Associate Professor	Rs 2300 Supdt. Engineer

basic sciences, where the discovery of laws behind phenomena is far harder, also far more significant, and where the scientist has to compete with international science. A national wage policy is perhaps the only remedy to enable science and technology to get their fair share of creative talent. Other measures would include the development of in-house R & D in industry. The Draft Five Year Plan (1978-83) has included many steps which are proposed to be taken towards this end. Vocational guidance should also help in preventing the over-flow of science graduates, which lowers their market value. Development of suitably job oriented courses at or after the graduate and post-graduate stages, combined with entrepreneurial training to enable them to settle in self-employment, would also be helpful. Suitable vocational courses are especially important as the continually diversifying economy and industry are throwing up new opportunities and shortages of various categories exists side by side with superfluity. The absorption of science course products at various levels will draw into the science stream better and more talented science students. The condition of admission to Ph.D. should, however, be very strict, so that only those go in for research who are really fit for it. Those who complete their research with distinction should have prospects as bright in R & D as equally bright students command in other sectors. To promote inter-disciplinary research capability, the Education Commission has recommended that bright young engineers should be encouraged to enrol for Ph.D, in basic sciences if they so choose. To improve the quality of the Ph.D. entrant and his aptitude for research, top research scientists should take graduate and post-graduate classes and some of the bright students should be initiated into research methods from the under-graduate stage itself. Another step which will immediately help the future researchers would be the introduction of much greater flexibility in the choice of course combinations. That would develop the student's inter-disciplinary capability. Moreover, some of the modern technologies like Atomic Energy and Nuclear Technology Electronics and Space Technology are highly inter-disciplinary. Hence the emphasis on the inter-disciplinary character of all courses, including the Ph.D. in countries like the USA, the USSR, Japan and West Germany. Early initiation into research and contact with top-ranking scientist at the under-graduate and post-graduate stages, combined with careful identification of priorities as the NCST is doing, should enable the student to choose his subject for Ph.D. research much more discriminately than today when he has to depend only on a second rate guide to suggest the subject to him as his teacher had done it for him years back. The number of students a teacher can guide should also be limited so that he can give to each student adequate attention which is not the case today. Ph.D. students should also be engaged partly in teaching. Live contact with brilliant post-graduate students should act as a stimulus to them in their research.

As regards teachers, the place of front rank scientists, as in developed countries, is the universities where they can exert their maximum 'multiplier effect.' Unfortunately the setting up of the National Laboratories denuded the universities of talent. Nor are we always very particular about talent and experience when we select our teachers. As Dr Alladi Krishnan pointed out we are quite compromising on that account. Nor do we consider their research work as of critical importance when promoting them. Even in regard to delegations to foreign conference it is not the research work of a scientist that counts but his connections with the official world. In foreign universities teachers have to give 50 per cent of their time to research. Here at least one-third should be given for research The research that is carried on is very often linked to priorities of international science and of peripheral importance to the country. The local environment, where they could do front-rank science because they alone would be looking at it, is ignored. The atmosphere in the universities is not conducive to serious research work. 'Parasitic' team work, where the name of the head of the Department invariably appears on research papers produced by the faculty damps the enthusiasm of the young faculty members. Procedures for release of grants are also very irritating and frustrating to the active researcher. Incentives for good teachers and research workers in terms of preferential treatment do not exist. The higher salary scales, which should have acted as an incentive are enjoyed by all and sundry and are taken for granted. There is also lack of mobility of teachers within the university system itself and between the universities and national laboratories and between the universities and industry.

To remedy the situation a multipronged attack would be necessary. The most important and perhaps the most difficult task is to create an atmosphere of serious study and research in the universities. It is, however, a very complex issue. Secondly, in recruitment and promotions, the criteria of ability and dedication ought to be applied much more rigorously and performance in research ought to be given considerable weight.' Thirdly, mobility of teachers within the university system and between the university system and the National Laboratories as well as industry should be promoted. People within industry ought to be called for short or long periods and given respected positions within the university system. Similarly eminent scientists in the universities ought to be invited to hold honoured positions in industry. This is happening in Holland and Germany, for example, as Dr Kiran Karnik pointed out in the panel discussion on "Progress of Science and Technology." Again. in these countries at least four-fifths of the university Professors are people who work for one or two days in a week in the university and the rest of the time in industry, in research or production. They are designated as professors and guide research students of the universities. Most of the students get their Ph.D. degree, working in the research establishments of industry. Vast changes are required in the attitude and structures of industries and the universities before research work in the universities can contribute effectively to industrial development. Fourthly, universities should develop the capability for and provide consultancy services to industry, which will stimulate the faculty by bringing in monetary gains and recognition. Fifthly, an atmosphere of a scientific community should be created and a feeling of pride in their work appreciated by their peers. The setting up of a national organisation of scientists, which would represent India on international scientific organisations, advice Government on scientific policies, establish international relations in science with other countries etc. would be an important step to create that atmosphere. Quality journals should be started—some have been started—in which scientists publish their research papers and seek the recognition of their peers. Conferences should be organised, performance in which should form the basis for selection for delegations going abroad. Sixthly, centres of excellence should be created, within the university system, where our top scientists could find full expression. The setting up of Centres of Advanced Study is a step in the right direction. As many teachers as possible should be recruited in the universities from these centres to maximise their 'multiplier, role and justification in a democracy. Lastly, participation in joint projects, as are now being promoted by the Department of Science and Technology, would also cross-fertilise ideas, give scope to wider talent recognition and prevention of a feeling of stagnation.

The University Grants Commission has, launched a number of measures in some of these directions which need mention. They have instituted a number of scholarships/fellowships/associateships to encourage (apart from students) young faculty members to develop their research potential at an early age, and senior faculty members to visit other institutions/industries for purposes of cross-fertilisation of experience etc. They assist projects of basic research in emerging areas, basic research with clear potential for application and applied research. They also assist publication of research documents. They give travel grants to teachers to attend conferences. They also enable universities to participate in collaborative research within the country and outside. Retired teachers occupied in research are also assisted. The U.G.C. has also a programme of progessive up-graduation of Departments into centres of excellence. With the help of science panels they identify departments which should be specially supported in certain identified areas of specialisation and afterwards considered for further up-graduation. In 1972 the Commission launched a programme of special assistance to selected departments to enable them to develop their potential in certain fields so that ultimately they become centres of excellence in those areas. They started a programme. as early as 1963-64, a programme of Centres of Advanced Study, whereby a limited number of departments were enabled to pursue excellence, inter-disciplinary team-work and aim at international standards in certain selected fields. In 1977-78, 14 centres of Advanced Study were functioning in Science and 33 departments had been approved for Special Assistance. The aim in these special schemes is to enable the universities to specialise in fields of special R&D significance, interact with other R&D institutions, attain international standards and ultimately be in a position to contribute on the frontiers of science. They would also have the necessary facilities to adapt themselves to the changing R&D needs in view of the growing complexity and diversification of the Indian economy. Every effort will be made to give staff, infra-structural facilities etc. to enable them to reach the critical size required for achieving these aims. Realising the strategic importance of these schemes in the country to R&D effort the UNDP agreed' to supplement the U.G.C.'s effort by providing the international component. Highly satisfied with the results, the UNDP later assisted a few selected departments out of those receiving Special Assistance from the U.G.C. After reviewing the progress they have recently agreed to provide $ 2.5 million to further assist these departments. This shows the potential of the Indian University system, which we must develop and exploit. Another very significant project that the U.G.C. has launched for active participation of the universities in the country's R&D effort is the U.G.C.—ISRO (Indian Space Research Organisation) Collaboration. The attempt is to try to work out the delicate balance between too specific and narrow research—which sponsored research has a tendency to become due to the very specific preoccupations of the sponsoring agency—and diffuse research which it has a tendency to become if the universities are left to themselves. The academic institutions arrange programmes of teaching, training and research related to the broad areas of Space Sciences, Space Applications and Space Technology to develop trained manpower required for the Indian Space programme. There are also joint research programmes between ISRO and Universities/Institutions. Scientific work is organised at ISRO establishments for students and staff members of universities to impart an awareness of different aspects of space research, especially to students at graduate and post-graduate levels. Multi-lateral cooperation programmes between ISRO, universities, national laboratories and other governmental agencies are also designed, Sponsored research by other organisations like the CSIR, Atomic Energy Commission etc. also gives opportunities to university teachers and research students. These are valuable directions in which the U.G.C. is moving to link the universities more effectively with the R&D effort of the country. Much greater progress, however, in these directions will be necessary in a vast country with a huge university system before adequate policies and programmes can reach the critical precision and size.

As regards priorities in research, they need very careful identification because of limited resources, both of manpower and finance, and unlimited needs. Our universities at the moment are doing mostly fundamental research which also is related to the priorities of international science, where we can make only limited contribution, lacking the infra-structure of the developed countries and being far away from the environment of those countries, which has stimulated their scientists to choose the areas that they have selected. On the other hand, our own environment and problems which could give us first-hand knowledge and creative stimulus, where we have the opportunity of being first in the world, is neglected. That is why the Education Commission emphasised the need of identifying the special thrusts in which we have an advantage and which we should, therefore, develop. One such area which they pointed out was Mathematics, where it should be possible for us to place India on the world map in the course of the next two decades or so. This also coincides with the still greater importance which Mathematics is bound to gain in the next few years because of the cybernetia revolution which should be in full swing by the end of the century and which may have an impact on men even greater than anything that has happened so far in human history. Many other areas, where we have an advantage and which are crying for solution have already been mentioned in another Section. The NCST is our major agency for identification of critical areas of research and university research should take full advantage of it. The Draft Fifth Five Year Plan stated :

> "RDD Programmes have been identified covering a large number of disciplines of science and technology where oriented basic research has to be undertaken by the scientists and technologists in the Universities, IITs and other higher educational institutions. NCST programme cover. areas like minerals. marine resources special materials, meteorology, mechanical and chemical engineering etc.; the programmes are complementary to the applied research programmes to be undertaken under various scientific agencies and departments of the Government."

So a basis exists for the universities even of 'with whom' and 'in which area' to cooperate. The University Grants Commission has also given a clear lead in this matter :

> "While universities will continue to be involved in fundamental research, application—oriented research, especially in collaboration with national laboratories and industries, needs to be specially encouraged in universities. Both fundamental and applied research required the highest intellectual qualities."
>
> "In order that the universities may be able to contribute to social development and change, they have to be outside the four walls of the class room and get involved in a participatory understanding of some of the social problems. Such research programmes as contribute to social development, especially to rural development, should be encouraged."
>
> "In the realm of research, itself, both fundamental and applied research should receive adequate attention but in a country with inadequate resources and stupendous problems priority should be given to research projects, that have a direct relevance to the problems of the community."

As regards the material support to science in the form of laboratory buildings, equipment and libraries, the needs are immense and in view of the dearth of resources utmost ousterity, functionability and maximum utilisation should be the guiding principles. Special emphasis should be put on laboratory design and centralised facilities created for research in design and for acting as a clearing house for information on the subject for the guidance of the universities. Expensive buildings should be avoided as far as possible, not only in the interest of economy but also in the interest of science itself. As Fred Hoyle has observed, "people who work in marvellous buildings are dominated by those buildings, whereas it is the other way round for people who work in rabbit warrens. The builders of the great European cathedrals knew this perfectly well. Walk into a big cathedral and it wipes your brain clean of all thoughts. The same thing happens when you walk into these wonderful modern office blocks. The same thing happens all too easily in big science."

So far as equipment is concerned more and more complex, expensive and sophisticated equipment is required. Moreover, it becomes obsolete very soon. To depend, therefore, on imports would not be feasible. One has, therefore, to develop indigenous capability of developing one's own instruments. In view of the importance of science in R&D, the development of instruments industry and R&D therein should be regarded as of the highest priority. Sophisticated equipment whether indigenous or imported—because of its costs—must be centrally available for utilisation by a number of universities. Repair and maintenance facilities should also be developed. Computer facilities and capability in computer science and technology is indispensable to modern science. For the purpose, the University Grants Commission has approved many research projects in the universities involving instrumentation development. The Commission has also approved a scheme for the setting up of Regional Instrumentation Centres for taking up servicing and maintenance activities. service facilities and instrumentation development work. These centres will work in cooperation with the local industries, R&D institutions and the regional offices of the Central Scientific Instruments Regional Organisation (CSIRO) of the CSIR, During 1977-78, the Commission desired to support the setting up of the Western Regional Instrumentation Centre at the Bombay University. University Service and Instrumentation Centres (USIC) are also being set up for repairing and servicing instruments and providing analytical services. Universities are also being helped to acquire computers or buy computer time. Provision of courses to meet the manpower needs of the country in computer sciences, including maintenance and operational personnel is also under consideration.

An indispensable support to research is the foreign journals. Their supply to the universities is inadequate and there is considerable demand for back volumes. The Commission has decided to set up Regional Library Centres by strengthening the libraries of selected universities and making resources of these centres available to other institutions in the region.

To achieve results, the administration of research is as important, if not more important, than any other factor. The main defects in the present administration are loading the Heads of Departments with administrative work, the cumber some procedures by which researchgrants reach the researcher, attachment of too many research students to the head of the Department and parasitic team work where the name of the Head of the department appears on every research paper prepared by the Department. There is then departmental isolation which stands in the way of inter-disciplinary research. Remedies to these problems need urgent attention.

CATEGORY-I

Humanities and Social Sciences

As regards the humanities and social sciences, their development erientation is a post-Independence phenomenon—the one dictating the goals of development and the other forging tools for social transformation. It was their relevance to development that led the Planning Commission to set up the Research Programmes Committee in 1953 to encourage relevant research in social, economic and administrative fields. But the volume of work done was limited—only 400 projects up to 1969. It was to expand this work by an autonomous organisation that the Indian Council of Social Science Research was set up in 1969. In the meantime the UGC had been assisting the research effort in humanities and social sciences of the universities. Their programme of Centres of Advanced Study in these disciplines had already started in 1963-64, when 11 centres in different universities were recognised for assistance. In 1968-69, 2 more such centres were recognised. By 1977-78, however, only 9 centres of Advanced Study in these subjects were functioning in the country. In their programme of Departments for Special Assistance also the humanities and social sciences have their share. The object here too was development—orientation of the humanities and social sciences. The Education Commission of 1964-66 emphasised the importance of developing our research capability in these disciplines. To make up for lag in science, we have an opportunity of contributing to world thought through research in humanities where our rich cultural heritage places us at a special advantage :

> "To redress the balance, we like to think that our scholars will make significant contributions to the sum total of human knowledge and experience in the fields of the social and the pedagogic sciences and humanistic studies, where our old traditions and the present challenges posed by social developments present unique opportunities for creative work."

The Commission noted with regret the comparative neglect in India, where social sciences have been lost, except economics, in the wider fields of humanities for historical reasons and they have not had any appreciable impact on Indian society and policy making, which they could have had, unlike in the West, where during the last forty years, their impact has been deep and extensive and the Commission made certain important recommendations so that the social sciences could get their adequate share of talent and finances, and be geared up for their important role in national development. The emerging science of Technology Assessment to which a reference has already been made, has further underlined the importance of the support of social sciences for making appropriate choices even in technology.

The most important development science is education, "unfortunately, however, for various reasons educational research in India" is still in its infancy. Its quality is small and its quality mediocre or poor." On the other hand education to be meaningful has to be at the heart of development and has to provide it its pivotal thrust. Education in India is out-dated and badly needs innovations. But educational research management has been largely a failure.

CATEGORY II

Research in Agricultural Universities

Developing appropriate technology through research and getting it across to the farmers are crucial to a country like India, which derives about 50 per cent of its GNP from agriculture, where, population growth is always threatening to outstrip the growth of food production and where the large majority of the people are employed in agriculture or allied activities. It was this realisation that led many Committees and Commissions to make recommendations culminating in the setting up of the Agriculture Universities in the country. There are 21 of them, along with the Indian Agricultural Research Institute with a deemed university status. The basic characteristic recommended for these institutions was the combination of education, research and extension, corresponding to the complete RDD chain in industry.

These universities are in various stages of development. Their working was recently reviewed by the Review Committee on Agricultural Universities under the Chairmanship of Dr M.S. Randhawa, the former Vice-Chancellor of the Punjab Agricultural University, Ludhiana. While agricultural education has been transferred to these universities, research and extension have been transferred only in varying degrees, and in many places still continue to be with the State Departments of Agriculture. Another variable has been the quality of leadership that the different universities have been able to get. Their structures in the form of the number of campuses and integration of the various units constituting them has also varied. The lack of coordination of the various universities in a State has led to duplication of effort and wastage of resources in many

States. They were also established in different years. Their performance, therefore, differs very widely. Taking them as a whole, however, their impacton agricultural production is already considerable. They have significantly improved agricultural education, trained specialists of quality, reduced wastage and become main centres of disseminating useful knowledge to farmers. They are fostering team spirit and a healthy change in the outlook of the teachers, researchers, farmers and the administrators. "Their direct contribution to programmes like pedigree seed production, fertiliser use and National Crop Demonstrations is impressive."

Many structural and organisational hurdles have yet to be evercome. Financial support has not always been adequate. Expansion has not been always a planned one. The necessary rural orientation, especially in the field of Home Science, is not there. Distortions have crept up in the programme and led to the comparative neglect of basic research, education and extension. Inadequate steps have been taken for feculty development, and so on. It is, however, hoped that with steady State support and wise leadership the Agricultural Universities have a very bright future in this country.

CATEGORY III

Medical Research

A very considerable research effort needs to be mounted for discovering methods of quick expansion of facilities, remedies for endemic diseases, adaptation of the results of research in other countries to our own situation, participation in the international effort to advance the frontiers of knowledge etc. Universities by their multi-disciplinary capability are the best place for medical, as for other research. They are also placed where talent can be identified at an early age and stimulated through a research atmosphere as well as through creative teaching. The Indian Council of Medical Research—founded in 1950 as the successor to the Indian Research Fund Association—therefore, concentrates largely on the universities. Indian medical research, despite its early beginnings, is, however, only a post-independence phenomenon, and has grown under the stimulus of the Five Year Plans. "The Bhore Committee (1946) drew special attention to the almost complete absence of organised medical research in the departments of medical colleges, the lack of facilities for training young minds in the scientific approach to medical matters and the throttling effect which routine work in the institutes was having on medical research." The research support of the ICMR in the form of fellowships and research projects has considerably increased. National Institutes for high level research have also been set up, apart from increasing of research facilities in colleges. The over-all effect, however, has not been very marked. Research effort in the colleges is hampered by the load of teaching and service duties. Again, in government colleges the senior professors are also transferred which seriously disturbs the research facilities they had created round themselves. The system of allowing private practice in some of the colleges also leads to neglect of patient care, which, in turn, adversely affects research. Another short-coming in the research effort has been in neglect of immediate problems. The quality of research is also generally poor. "Efforts were mostly towards collection of disjointed and isolated research work by individuals/agencies in the country. Ad hoc research programmes taken up did not yield commensurate results."

The priority areas on which the research effort of the country needs to be focussed, says the Planning Commission, are major communicable diseases, fertility control, nutrition and metabolic problems and delivery of health service. The new challenges posed by malaria, kala-azar and leprosy have to be met by redoubled research effort to find new remedies. Research would be necessary to investigate the problems that reveal themselves during implementation so that necessary corrective action can be taken. Various alternative strategies for delivery of health services to all and at minimum cost would also be investigated and their validity and effectiveness checked through pilot projects.

The Local Dimension

It may be useful to look at least at one university a little more closely as an example. The author cannot do better than choose the Panjab University of which he has more intimate knowledge than that of any other university. The Panjab University is a major centre of higher education in the country. The University Grants Commission has identified 19 departments—a number larger than in any other university in the country—for implementation of its scheme of teacher fellowships leading to M. Phil. and Ph.D. degrees in Science and Humanities. The ICSSR has located its North-West Regional Centre in the university and operates it in collaboration with the university. The University Grants Commission has recognised its Departments of Mathematics and Geology as Centres of Advanced Study. The Departments of Sociology, Chemistry and Botany have been recognised as Departments for Special Assistance. The Department of Geography has been selected for substantial assistance under the U.G.C.'s major research projects to promote research in population geography. A Central Instrumentation Laboratory is being set up which will serve a number of departments in the university and a number of other universities. The various programmes are indicative of the development orientation and potential of the university. There is, however, no room for complacency; and much more effort will be required to be put in to develop local and national developmental relevance, inter-disciplinary research, oriented basic and applied research, inter-institutional collaborative research etc. The performance of the various departments varies considerably. To some extent it is due to the nature of the discipline concerned but perhaps largely it is the result of varying awareness among the different departments and the absence of suitable structures and conventions which need to be evolved. For example, while quite a number of departments have voluntarily cooperated in some fields with other departments, a suitable mechanism has yet to be evolved so that inter-disciplinary team work becomes a mode of normal functioning. The progress in most of the other universities would be still more modest.

CONCLUSION

Thus university research has to be an integral part of the total R&D infra-structure set-up by various countries to meet the challenge of sweeping changes unleashed by science and technology. The universities because of their multi-disciplinary capability are ideally suited for the comprehensive and inter-disciplinary research effort required for meeting this challenge. To realise their full potential, however, they have to interact closely with the other parts of the total R&D infra-structure set-up in the country. The R&D effort in turn must be guided by our socio-economic goals. The Indian experience is that the Science and Technology Plan ought to be tied up with the over-all development Plan.

Our development goals may be summed up as welfare, security and growth. Their imperatives for our R & D effort, as regards the areas of concentration are: the area of minimum needs; those segments of our economy where the scale of operations would make the R&D effort cost effective; the sectors of high technology where either our security is involved or where it would be in the national interest to remain in the front-line of research; and finally, those areas where knowledge is expanding very fast and we need to develop our capability for making wise choices in regard to the import of technology or equipment. In regard to the strategy to be adopted, its components would need to be: maximum self-reliance, buying outright technologies such as are absolutely essential, which we have the capability of adapting and improving upon and which do not create ecological problems; borrowing only appropriate technology as fits in with our traditional technologies—which must be most carefully and critically examined—our development strategies and the infra-structure available; "leap-frogging", wherever possible, with the help of science of forecasting and our special endowments; promoting greater interaction between science and technology; increasing the efficiency of the R & D effort through intensifying and expanding in-house R & D activities in industry; building up the confidence of R & D men, developing their social conscience of social responsibility; and attracting the best talent to the R & D net-work through improved salaries and service conditions.

For meeting the challenge of these tasks we have rapidly developed an infra-structure since Independence. The total expenditure on R & D has increased from 23 crores in 1958-59 (in 1947 it would be still less) to Rs. 400 crores; and the S & T manpower from about 21,000 to about 2 million. From the S & T manpower point of view, India is third in the world, next only to the USA and the USSR. India is now counted among the industrialised countries of the world. She has been rapidly building up her R&D infra-structure, which consists today of DST with its two apex bodies: the NCST and the NCEPC and a number of institutions including NISSAT and the CSIR; other Central Government Ministries, Departments/Agencies with their in-house R&D institutions; R&D Committees at the State level; R&D industry; and universities, IITs, Regional Engineering Colleges and other institutions of higher learning like the Indian Institute of Science, Bangalore. Since the beginning of the Fifth Five Year Plan continuous progress has been made to weave the entire R & D structure into a system with its various parts interacting with and reinforcing each other. In this complex the role of the universities and other institutions of higher learning is to create a cadre for R & D effort, give grounding in research methodology and in basic or fundamental research, to develop capability—to a limited extent—in applied research, to prepare cadres for Technology Assessment (TA) to provide consultancy to industry and extension service to communities, and advise government on science policy and programmes.

As regards the present position of R&D in the universities, IITs and other institutions of higher learning it is that the best *students* are not drawn towards the basic sciences and research part of the R&D spectrum due to discouraging pattern of utilisation. A national wage policy, which would direct creative talent into required channels and a much more rigorous and discriminatingly flexible approach in the selection of Ph.D. students are required as well as steps to improve their choice of areas of research, guidance and inter-disciplinary capability. So far as *teachers* are concerned, the universities are not attracting front-rank scientists due to the absence of definite preference for research ability in recruitment, promotions and membership of delegations to international conferences. The teachers do not give adequate attention to research 'Parasitic' team work prevails. Procedures for release of grants are frustrating. To remedy the situation a multi-pronged attack is called for: creation of an atmosphere of serious study and research; giving research ability and dedication much greater weight in recruitment, promotions etc.; promotion of mobility of teachers within the university system and between it and the National Laboratories and industry; development of capability for and practice of consultancy to industry; creation of a sense of belongingness to a scientific community; the setting-up of a national organisation of scientists to advise Government: starting of quality journal; setting up centres of excellence, connected with and helping the rest of the university system; and participation in joint projects. The UGC have already launched programmes to improve the situation in many of these directions and the university system has already responded to these initiatives. These efforts will, however, need to be continued over a long period and their scale of operations increased to produce the required impact. Careful identification of *priority areas* is equally important and the universities are being helped in this direction by the work of the NCST and the UGC guidance. The most important point here is to identify which are our most important needs and where we have the maximum advantage in competing for international science honours. Very often the two categories coincide. As regards *material support*, the determining factors are our constraint of resources and our large needs. We need the utmost austerity, consistant with functionality, in laboratory buildings —which will call for considerable research in laboratory design and guidance to the universities; utmost emphasis on the development of instruments industry and of R & D therein to build up maximum self-reliance; and pooling of expensive and sophisticated equipment with centralised provision for maintenance and service facilities. The UGC is moving in these directions also. Regional Library Centres, too, are being set up to increase the accessibility of foreign journals. To achieve results the *management of research* needs considerable streamlining.

So far as the humanities and social sciences are concerned their importance in national development is well recognised and steps are being taken up by the U.G.C. and the ICSSR to make up for the past neglect. Much lee-way, however, has to be made up before they can develop their full potential for supporting development.

Agriculture being at the heart of Indian economy and our existing productivity, on the whole, being very low, agricultural research has to command the highest priority. Under the guidance of the ICAR, 21 universities, along with the IARI, have the responsibility for agricultural education, research and extension, the close linkage of which is the basic feature recommended for these universities. The Universities are, however, in varying stages of development, depending upon the functions actually allocated to them by the State Governments, the inputs and leadership provided etc. Their impact, on the whole, however, has been considerable on the quantity and quality of cadres and agricultural productivity through research and extension. Their shortcomings have been pointed out by the Randhawa Committee and with State steady support and wise leadership, the Agricultural Universities have a bright future.

The problems of health and family welfare pose serious challenges to medical research. Medical Colleges and independent institutes constitute the infra-structure for it. The Five-Year Plans have provided the funds through ICMR and the Ministry of Health. The priority areas have been identifed. Medical research, however, has still to pick up the required momentum. □

Significance of Non-formal Education

(Continued from page 227)

system is characterized by an unusual degree of rigidity: innovations are slow and difficult. and the content of education often lags behind the changing social reality. It either prepares the pupils for nothing in particular or it trains them for very specialized tasks—a kind of specialization, the social consequences of which are questionable. Education has become an item of consumption—a status symbol —and with every passing year its costs are multiplying. Many developing countries, and even some of the developed ones, find the financial burden unbearable. Undeniably education can be a meaningful human input towards development, but many aspects of its content and quality are such that it becomes dysfunctional towards this end. Several critics have pointed out its stereotyping effect. It produces "packaged commodities" and generally curbs creativity. Many vulnerable sections of society and their special problems go unattended because of the rigidity of the pattern.

Non-formal education, as a concept and a strategy, has emerged as one possible method of relevant mass education. Given a spirit of community service its cost can be minimal; at any rate, it would not constitute a crushing financial burden. With a dynamic and variable strategy, its programme can be tailored to the specific needs of different groups and segments of the population. The accent in these programmes need not essentially be on academic learning: they could be directly related to vital life contexts and pressing needs of groups and communities. Non-formal education is primarily to be aimed at learning and not at certification, although it could be used also for acquiring qualifications comparable to those offered by the formal system. It need not be viewed essentially as a substitute for formal education, its supplemental role is important. It can take care of areas of learning that are left untouched or at best are dealt with only superficially by the formal system. The entry into it is not barred by any rigid eligibility prerequisites. People can enter and leave the non-formal stream according to their interest and needs. Ideally, it should have both an awareness content and a skill emphasis. The former will generate in the people an understanding of their condition and predicament. The skill component would equip them for efficient handling of the tasks they actually have to perform in their everyday life. Thus, non-formal education can at once establish a meaningful relationship between man and his rapidly changing environment as also between work and education. It may be found specially suitable for peasants workers, and migrants. The learners. under the system, can participate in the educational process at all levels. It can make effective use of educators who are not teachers in the formal educational system. It can prove an important instrument of community advancement, rather than only of individual advancement. In it the potential of culture can be tapped and integrated with some aspects of academic culture. It can be a great help in abolishing the gap and ranking between manual discipliness and intellectual disciplines. Purposive links can be forged between general education and vocational education. It could also develop into a major experiment in self instruction. It is well known that knowledge becomes obsolete in every seven years and it has to be constantly updated. This can best be done through non-formal learning.

The new strategy of non-formal education is still in an experimental stage. Its success would depend on the vision and innovative capacity of those who handle it. It can be powerful instrument for the emergence of a meaningful society and creative education. □

CONVOCATION

Science & Technology in Human Development

Science and Technology has been eminently and awe-inspiringly successful in what one normally refers to as hardware projects relating to products, processes and tasks that are well defined; the most complex of them was the Manhattan project to develop the atomic bomb and man's various adventures into space. But in the complex aspects where hardware and software have to be combined, involving interaction with society and its needs, our successes have been much more limited.

The headlong advance of science & technology has had two important consequences: first it has placed great power in the hands of those who have been able to participate in these advances, powers that can be used for exploitation; secondly the advances in transport and communications have made the world a small place and highly interdependent. These aspects and the growth of human population has brought about a situation where we have to evolve new societal patterns. The existing structure of society can only result in increasing human misery, and conflicts that will grow and enlarge. A new Order has come about; the alternative is chaos. In this connection, the United Nations has called for a New International Economic Order which aims at reducing the disparities that exist between nations; indeed, corresponding to this there will be need for a new internal order in each nation. The problem is really not one of economics alone. It is in human expectations, aspirations and value systems. It would have been better to define this as a New international Order.

What is envisaged is that the growth and human development will, and must, continue. But it should be in a way in which demands on resources and on the environment, are reduced. One would work towards life styles that are less energy intensive. The new order is not meant to impoverish developed countries, but to bring up the developing countries and less privileged sectors of society; a task in which the developed countries have an important role to play. In this process, the different cultures and differences in life styles of different society would need to be safeguarded. Most important, one needs the development of value systems that provide for happiness without putting unnecessary demands on material needs. It is in this intellectual exercise, of working out new and feasible pathways to development in a multi-disciplinary approach to problems—particularly bringing together the humanities, the sciences, engineering, technology and medicine in innovative thinking that can provide leadership of national endeavour that Universities can play an important role.

Some remarks on University education

Those emerging from the portals of this University will be moving into this complex world where rapid and dynamic changes are expected to, and should take place. Unfortunately, a great deal of the educational system has concentrated on past experience and transfer of information. This would be satisfactory if one was emerging into a relatively stable and static situation. The situation is somewhat analogous to learning about a particular piece of equipment and then coming out into the world to handle such pieces of equipment from the point of view of maintenance, repairs etc. But what could one do if the equipment one comes across is something totally new and different. One could then learn by adaptation if the change that has taken place has not been too great. But if the change has been rapid or significant, then one is faced with the equivalent of a cultural shock. What is really needed is an education that looks into the future and which anticipates the nature of developments. Furthermore, it should be what good education was always meant to be; bringing out the latent ability within the individual to think and reason, rather than memorize a large volume of information for an examination. We have been tinkering with the whole process of educational change but have done very little in a substantial sense. An important fact to remember is that the educational system involves human development where the impact of any change can be seen only in the time span of a human generation. One should, therefore, bear this in mind in making changes.

We are, of course, aware of the need for a form of education which enables a human being to become a productive member of society. For this he or she needs training in some profession; this is in terms of skills, techniques and information. Such training starts at the school level. At these levels the examination, certification and maintenance of standards is at the level of Boards of Education and such like; though once upon a time many prestigious universities in India used to conduct even Matriculation examinations. In the case of higher professional training, the aspects of examining, certifying and maintenance of standards is often done by professional associations such as the ones in engineering, accountancy and the like. If the University regards its tasks largely as performing such a function, but only corresponding to a different syllabus, certificate or mode of functioning, then there will be very little justification for the existence of universities created by Acts of Legislature with all the paraphernalia associated with high academic institutions of learning. Clearly, universities represent the apex of the pyramid of learning, of which the schools and colleges form the base. They must be concerned with highest levels of training in areas that involve thinking and not purely skills; this almost necessarily leads to a concomitant development of knew knowledge and insight. Students are exposed to information and thought at the forefront and participate in developing new knowledge and insights themselves. It is thus that the teaching role of a university is strongly linked to research of an innovative and original type, and should be fostered.

If one looks at Universities around the world one finds a wide spectrum. Prof. Roger Revelle has remarked: 'American universities are as diverse as the flowers that bloom in the Spring. They are diverse in every way; in size, sources of support, levels of funding, standards for students, and quality of faculty scholarships. Some have many professional schools, others have none. Some lay great emphasis on basic research, others applied science and technology, while in most the quantity of research is minimal and the quality is low."

In the case of Indian universities, one finds enrolments ranging from a figure close to 2.5 lakhs to a few hundreds; I am not, of course, taking note of universities just set up that might have extremely low enrolment numbers. It is clear that all universities cannot be alike in their character, capability, standards and standing; but we should aspire to have some universities in the country whose standards are comparable to the best in the world, and of which we can indeed be proud. And in this regard, as an alumnus of this University which was founded in 1857, the year of the First War of Indian Independence, I would hope Bombay University would be in that category.

However, if a large part of the work of the university is concerned with an enormous student body and associated problems of management, and where its inputs are primarily in terms of examinations and certification, then that part which is concerned with the highest levels of training and research will be submerged in this larger, more routine, activity. It would be best for a University aspiring to very high quality to restrict itself to the highest levels of teaching and research. On the other hand, since the whole of the educational system from the school and college level, right up to highest level of the university must be regarded as an integrated entity, and the University cannot be stronger than the inputs it receives from the systems below, the University must play a role in regulating the standards of school and college education and also in the process of selecting those who would benefit most at the highest levels that the university represents. The university must also be concerned with improving the standards of school teachers and college teachers on whom depends the standards of education in those institutions. But its own major activities, and in this I am only referring to a University that wishes to have standards of the highest order, must be in teaching and research at the forefront of human kdowledge.

Over the years, financial support for universities, particularly for modernisation, for new items of equipment, for support of research groups, and such aspects on which the ability of the University to accomplish research of a high order depends, has unfortunately been diminishing. It is clear that funding for research cannot be provided uniformly across the board to all institutions; there has to be a selective approach where finances are given to institutions that have demonstrated their ability to make most effective use of them. It is generally accepted that university research is highly cost effective, because of the fact that a large part of it is carried out by the student community who work on a very enthusiastic and dedicated basis. What they need to be provided is the right environment & facilities. Enhanced support to universities on a selective basic is vital and urgent; in providing this, it has to be remembered that the high level manpower needed for all developmental activities has to be produced by the university system; the situation to which the letter has been allowed to run down should be of great concern to those who would like to see high quality leadership in our developmental activities over the future.

Links between different types of research institutions

We are aware of the existence of many categories of institutions for research. This is as it should be for there is an enormous variety in the pathways to discovery. In India we have basically four categories of research institutions. There are those in the governmental sector such as the national laboratories of the Council of Scientific and Industrial Research, the Defence Research and Development Organization, the Atomic Energy Commission, the Space Commission, etc. Next there are the research components of institutions in the public and private sector that are concerned with industry. Then there is the great sector of research in the educational institutions, largely in the universities and IITs. And finally we have a large number of autonomus institutions, some closely coupled to education, others to industrial management, and yet others on their own. Each of these categories has its own strengths and weaknesses. Each operates in an environment different from that of the others and, therefore, sees problems and approaches from a different angle. In infrastructure, financing, age composition and many other aspects, these categories of institutions are different from one another. Their research efforts overlap to a certain extent; and this is all to the good, because no one approach, regardless of how clearly it may illuminate some facets of knowledge, is likely to reveal all aspects even of a small field.

On the other hand, the history of science is full of examples where tasks have been successfully accomplished by men and institutions which one might have said where *a priori* not the appropriate ones for the purpose. The first operational digital computers were designed and built in university laboratories. The discovery of radio waves from outer space, and of the 3°K microwave background radiation, so fundamental to our understanding of astrophysics and cosmology, and the first experimental demonstration of the wave nature of the electron were all carried out in an industrial laboratory. On the other hand, some of the most significant contributions to World War II, such as the development and application of operations research and the work on the atomic bomb, and more recently the guidance technology which made the Apollo moonlanding and the Polaris submarine system possible were all efforts by those who could be rightfully categorized as academicians. One could therefore say that, in a broad sense, different categories of institutions are appropriate for various categories of problems but that the distinctions need not be too strict or water-tight, for that would be the surest way to frustrate innovation.

What is important in my view is to establish associations and linkages between institutions for research coming in these different categories. For example, a university associated with a government or industrial laboratory may acquire thereby the stimulation of constant contact with applied problems and also have available to it the large scale facilities that are necessary and have been developed for applied research. Correspondingly, the government or industrial laboratory acquires increased contact with the very talented enthusiastic young students and the openness of the university environment. What is required in such a linkage is not purely financing of research in the university by the Government or industrial laboratory, but mutuality in participation. One has also got to ensure that the openness of the university system is not hurt by association with the government or industrial laboratory.

Once Dr. Homi Bhabha proposed the setting up of the Tata Institute of Fundamental Research, he remarked: "The Institute will be affiliated to the Bombay University. The Bombay University could send its advanced research students to the Institute's laboratories to work for their doctorates, for attending the few advanced courses and lectures that would be given on behalf of the University." I had the privilege of working for ten years under Dr. Bhabha at the Tata Institute of Fundamental Research, and then for about a decade I was Director of the Institute. My experience over this period was that University made very little use of the capabilities, the infrastructure and facilities that existed in this institution. The TIFR was no doubt affiliated to the Bombay University and was therefore part of it. Research workers at the TIFR could register for research degree of the Bombay University; but in this matter the University; was only functioning as an examining and degree-granting body. Some links were established only when the University Departments came into existence in subjects of relevance such as mathematics and Physics.

We have a large number of universities throughout the country. In their vicinity there are major research institutions coming under the purview of the Atomic Energy and Space Commissions, the Council of Scientific and Industrial Research, the Defence Research and Development Organization, the Indian Council of Medical Research etc. as also major industrial units, some with excellent R & D facilities. There is however, very little that is being done to establish strong interconnections between the University system and this infrastructure. There are a variety of schemes that I can think of which can be used for this purpose. The most classical is the use of university staff as consultants by industry and national laboratories. Such consultancy provides the academic community with opportunities to get acquainted with important industrial research problems which challenge the scientific imagination. The consultants can be used for probing areas new and unfamiliar to the company or laboratory, as well as for presenting lectures to the staff. It is my experience that very few lectures are given in most Government or industrial Research laboratories. Through these the academic community can be exposed to the industrial environment, its problems and its attitudes. Conversely, it is important to provide visiting professorships, adjunct professorships, participation in university activities on advisory committee etc. to those from industrial and national laboratories. These provide opportunities for scientists, from governmental or industrial laboratories to keep in touch with a broad spectrum of intellectual activity that a university represents and to widen their horizons.

(Excerpts from the Convocation Address delivered by Prof. M.G.K. Menon, Secretary to the Government of India, Department of Science & Technology, at the Bombay University, Bombay-7)

CAMPUS NEWS

Higher education and employment in West Bengal

A two-day Workshop on a study of 'Graduate Employment and Higher Education in West Bengal' was inaugurated by the Governor of West Bengal at the Ramakrishna Mission Institute of Culture, Calcutta. The study which was sponsored by the International Institute for Educational Planning and supported by the University Grants Commission, the State Government and the Calcutta University, was conducted by the Department of Statistics, Calcutta University.

The study, initiated in 1978, involved an analysis of secondary data relating to the socio-economic conditions of West Bengal, the growth of higher education and the employment and manpower situation in the state as also an analysis of data collected through a sample survey which canvassed 1928 students, 1343 employed graduates, 480 graduates job-seekers and 32 employers.

Some of the major findings of the study were as follows:

1. An examination of reasons for the pursuit of higher education shows that 60% or more of the responses are either 'needs of a specific future career' or 'better opportunities for employment.'

2. Majority (29%) of the students depended on their parents and relatives for career information.

3. More than half of the students do not expect to wait for more than one year beyond graduation for getting a regular job. Their average expected waiting time (17 months) is much less than the average period spent by graduate job-seekers without gainful employment (66 months).

4. The greatest percentage of students expected to be in the teaching profession.

5. The expected initial monthly salary of a student worked out at Rs. 677 as against the average minimum acceptable salary of graduate job-seekers being Rs. 556. Proficiency in English is looked upon as an important criterion for selection of graduates for a job. Incidentally, institutions of higher education are gradually reducing emphasis on English.

6. Nearly half of the responding students were willing to be self-employed.

7. About 80% of the responding employed graduates found their educational qualifications necessary for getting their jobs.

8. About 28% found their academic qualifications useful but inadequate and about 12% found these irrelevant.

9. A majority of job-seekers ascribed their failure to get jobs due to lack of help from relatives and friends and from political connections.

10. While students preferred 'allowing teachers to refresh their knowledge with related field experience', chiefs of the personnel functions suggested an exchange of faculty in educational institutions with executives in employing organisations.

About 70 participants attended the Workshop and the following topics were discussed in five sessions:

(i) PRESENTATION OF THE STUDY;
(ii) REVIEW OF THE STUDY;
(iii) HIGHER EDUCATION-GENERAL;
(iv) HIGHER EDUCATION-PROFESSIONAL; and
(v) HIGHER EDUCATION & EMPLOYMENT.

Some of the important statements made during the Workshop are listed below:

1. The Government should identify its potential recruits and arrange for their training for the respective jobs immediately after their high school education. Only those to be entrusted with teaching and research assignments as also those who like to pursue higher education for its own sake should be allowed to take collegiate and university education.

2. Education should not be regarded as a preparation for jobs and jobs should be delinked from degrees.

3. The extent of unemployment among graduates must be examined in the light of the quality of education received by the graduates and the definition of unemployment.

4. The notion of mis-employment should be reviewed in the light of experiences abroad. Thus a highly qualified person teaching in a secondary school should not necessarily be regarded as being underemployed or mis-employed.

5. The system of education in a country should be viewed as only a sub-system within the national socio politico-economic system and this system rather than the education sub-system should be expected to provide any solution to the problem of unemployment.

6. The numerical extent of graduate unemployment can be easily put down by curbing enrolment in higher education, provided social demand for education can be suppressed. However, this would be a wrong approach to the problem since this cannot imply any solution to the basic problem of educated unemployment.

7. The employability of a graduate is determined not merely by the quality of education recei-

ved by him/her (something which appears to be rapidly deteriorating) but also by the integrity of the employment process.

8. The problem of educated unemployment in our country has come to assume such a dimension that an economic solution cannot possibly be obtained. Only an ethical or moral solution can be sought involving a change in the attitude and value judgements of individuals, although a reorganisation of wage structures and a more uniform distribution of the national wealth can provide some economic solution to the problem.

6. Effective liaisons should be established between educational institutions and employing organisations.

Seminar on Gandhian studies

While inaugurating a 3-day All-India seminar on Gandhian Studies organised by the Kurukshetra University Prof. S.C. Dube, Vice-Chancellor, Jammu University, Jammu, emphasised the need to creatively interpret and employ Gandhian ideas towards the solution of our contemporary problems. He highlighted the various facets of Gandhiji's personality and his thought. Gandhiji's perceptive insights into the socio-economic problems facing the Indian people particularly have a meaning and significance in the context of contemporary situation, he added. Professor Dube further said that the issues raised by Gandhi related to the relationship between man and his work, between men, nature and society, have greater relevance today than they had when he first raised them. It would be unfair to dismiss Gandhiji's ideas as anti-science and anti-technology. Gandhi in fact had a premonition that the path of science and technology would lead to degradation of environment, pollution of atmosphere, ecological imbalances and depletion of natural resources. Besides, industrially developed countries have discovered, to their dismay, utat material wealth is not a solthion of social and psychological problems. Gandhi was against science for these reasons, Professor Dube pointed out.

Prof. Vikas Mishra, Vice-Chancellor, Kurukshetra University, in his presidential speech talked of two types of correspondences in the life of every great man. First type of correspondence is concerned with what he says and what he does, while the second type relates to the belief that everything is transitory and all that follows from it in various aspects of life.

Workshop on the strategies of integration of teaching skills at Indore

The Department of Education, University of Indore, organised a Workshop on "Relative Effectiveness of different Strategies of Integration of Teaching Skills." About thirty participants from the different parts of the country i.e. Assam, Delhi, Gujarat, Haryana. Himachal Pradesh, Madhya Pradesh, Maharashtra, Nagaland, Orissa, Tamilnadu and Uttar Pradesh, attended the Workshop. These participants had conducted various research studies aiming at to find out the effectiveness of different strategies of integration. Most of the research studies reported that a particular strategy of teaching skills does not differ from other strategy of integration. It was decided that these research findings should be replicated by employing suitable research designs and modified measuring tools.

The Workshop was sponsored by the NCERT.

Plant protection workshop held at Bidhan Chandra Krishi Vishwavidyalaya

The Bidhan Chandra Krishi Vishwavidyalaya organised a first State Level Workshop on Plant Protection. The topics discussed at the workshop included (i) Research; and (ii) Development. The following recommendations were made at the workshop.

1. A Coordinated programme on survey and surveillance of pests and diseases in different agroclimatic zones should be undertaken.

2. Assessment of crop loss due to major pests and diseases should be undertaken.

3. Interactions of pesticides with the predaters and parasites under different agroecosystems need to be studied.

4. Specific research should be conducted on (a) ecology of wheat ear-cockle disease in West Bengal (b) Intensive screening of local varieties for (disease and pest) resistance against different diseases and pests. (c) Survey on the pest and disease situation of paddy in the districts, adjoining to Bangladesh and other States with special reference to the migration and prepetuation of them.

5. Research on pests and diseases of pulses and oilseeds should be intensified.

6. Specific research should be undertaken on (a) Identification of virus diseases or pulses (b) Ecology of soil borne diseases of pulses (c) Breeding for resistance against rust disease of groundnut (d) Control of *Alternaria* blight, seed and seedling rot of Barassicas (e) Ecology and control of gram pod borer (f) Ecology and control of the pests of *Cajarus* and other pulses (g) Ecology and control of common pests of *Brassica*, *Sosamum* and safflower.

7. Investigations should be made to indentify the common pests and diseases of vegetables, having economic significance.

8. The pest benefit ratio of all the control measures should be made before recommending any method.

9. Research on alternative chemicals with low mammalion toxicity to pesticides of high residual toxicity should be undertaken.

10. Research on cultural and biological control methods for the important diseases of vegetables and potatoes should be undertaken.

11. Study on the diseases of vegetable and potatoes in transit, storage and in markets should be

initiated including screening of varieties for resistance to post-harvest infection.

12. Investigations should be undertaken for the integrated control of common pests and diseases of fibre crops.

13. Varietal screening for leaf blight of mesta and resello and cultural practices for the control foot rot diseases of them should be undertaken.

14 Research on the use of natural enemies for the control of jute pests should be undertaken.

15. As enough informations are not available on the pests and diseases of fruits and plantation crops in West Bengal extensive Research should be undertaken on these crops particularly on banana, pineapple, citrus, guava.

B. Development

1. A Coordinating Unit with the representatives of different Institutes, Universities, Colleges and the Directorate of Agriculture, dealing with plant protection should be formed for effective mobilization of the scientific manpowers towards cooperative, collaborative or complementary research for providing basic technological and scientific data pertaining to plant protection within this state.

2. Seed health testing unit should be organized in the programme of seed certification.

3. A unit for organizing regular training programmes on plant protection should be formed.

4. A laboratory for testing the pesticides should be established in West Bengal.

5. State level workshop of plant protection including the scientists, extension specialists and plant protection officers may be organized periodically on the crops under different farming systems.

6. Collaborations between the breeders, entomologists and pathologists should be established for breeding disease and pest resistant varieties.

7. A standard nomenclature for pests and diseases in vernacular suitable for mass media and extension workers, is to be prepared.

8. Roving and fixed plot survey for pests and diseases should be strengthened in all the agroclimatic regions and the scientists of the Agricultural University and institutions may be included in the team.

9. General awareness of the cultivators for the pests and diseases, their relations with environmental conditions agronomic practices, cultural methods, post-harvest practices etc. should be developed.

10. Regular training courses for the extension workers, pesticide dealers, and the cultivators should be organized on the techniques of plant protection and on the integrated control of pests and diseases.

11 Methods of communication should be improved using the modern techniques and should be regularly evaluated.

Survey of living conditions in hostels

The University Grants Commission has before it a survey of living conditions of students in university and college hostels, for follow-up action. The survey was undertaken by the Tata Institute of Social Sciences, Bombay, at the instance of the Commission following a suggestion made by Vice-Chancellors at a conference in 1975 that hostel facilities in the country were far from adequate.

The survey found that nearly half of the hostels in the country were unable to accommodate all those desirous of admission. While the majority of the hostels were adequately maintained, a large number were poorly looked after. A few of them were a hazard to life and limb.

It said that most of the hostel buildings had been put up after Independence. The sixties was the decade of the greatest growth. There had been a special effort after Independence to provide facilities for women. In fact, more women's hostels were built after Independence than men's.

It found that the provision of facilities in women's hostels was generally adequate and better than Men's. The cost of living was also lower. Few women's hostels had the kind of problems which men's hostels faced where it was found that rules, if they did exist, were broken with impunity in many of them since the hostel authorities did not enforce them. In general, however, in a majority of the hostels, students had learnt to be tolerant and got along with one another. They had also developed a sense of community.

One of the main findings of the survey was that the best provision of hostel facilities was in Punjab, Haryana, Kashmir, Himachal Pradesh, Delhi, Chandigarh, and to a lesser extent in Uttar Pradesh. Hostels in these States had a higher cost of living than elsewhere and also suffered more, comparatively speaking, from problems like drinking, clashes between groups of students and a general lack of discipline.

The worst provision of facilities according to the survey was in Bihar, Orissa, West Bengal, Assam, and the adjoining States and Union Territories.

The survey suggested the provision of multi-seating rooms or dormitory-type hostels for undergraduates in view of the rising cost of construction. Each room or dormitory could accommodate about 4 to 10 students. Provision for separate study halls should also be made, it felt.

To cut down on cost and improve the quality of food in students' messes, the survey suggested that workshops should be held for wardens in areas like budgeting, mess management and nutrition. More than half of the hostels were under-staffed, according to the report. The number of inmates in these hostels exceeded 50 for every single warden or senior staff member. In fact, in a few of these, the ratio even exceeded 1:100. The survey strongly recommended that steps should be taken to bring down the ratio to 1:50.

Residents of medical and engineering hostels were provided with uniformly good and often excellent facilities. In comparison, hostels for students of Arts, Science, Commerce and Education were the worst in the matter of facilities. The provision of facilities was also generally poor in hostels which catered predominantly to students from the low-income groups.

The survey called for efforts to reduce food cost. It said that for poor and needy students, all hostel dues except mess bills should be reduced to a token change, or waived altogether.

NAEP report presented

The Report of the National Adult Education Programme Review Committee was presented to the Union Education Minister, Shri B. Shankaranand. by Prof. D.S. Kothari in New Delhi recently. Speaking on the occasion, the Union Education Minister said that, one of the great things about Rabindranath Tagore was that he combined in Visva Bharati school education, higher education, culture and rural development. Sriniketan which is an inseparable part of Visva Bharati can be treated as a model of how every institution of formal education—universities, colleges and schools—should concern themselves with programmes of development of the community around them, including their education. Tagore did not treat Sriniketan as an incidental and unimportant activity of Visva Bharati but gave it immense importance. It would be a great day when all universities will move in that direction. It would help in programmes of rural development and adult education, but what is more important, it would be the beginning of reform of our educational system—the central aspect of which has to be the relevance of the system to the community in which it exists, particulaly the illiterate and the poor among them.

ISM to start postgraduate programmes for Petroleum Industry

Indian School of Mines which is deemed to be university since 1967, has received clearance of the University Grants Commission to start two postgraduate programmes for the Petroleum Industry, viz., an M. Tech programme in Petroleum Engineering (for graduates of Mechanical and Chemical Engineering) and an M.Sc. Tech programme in Petroleum Exploration (for holders of Master's degree in Geophysics etc). With this additional sanction, all the main Deptts of the School are now offering postgraduate programmes. This postgraduate activity which started at the School in 1973 now covers a very broad spectrum covering Mining Geophysics, Mineral Exploration, Petroleum Exploration, Engineering Geology, Drilling Engineering, Mining and Mine Planning, Mining Machinery, Fuel Engineering, Mineral Engineering and Industrial Management, in addition to M. Phil courses in Applied Geology, Applied Geophysics and Applied Mathematics. In addition, the School offers two Advanced Diploma courses, one in Mine Surveying and the other in Mining Instrumentation and Communication.

Modified tution fees for the research scholars

The Syndicate of Madras University at a special meeting held recently to consider the demands of the research scholars decided to reduce the research and tuition fees for the Ph.D. and M. Phil students. The revised rates will come into effect from the academic session 1980-81.

The research fee for Ph.D. scholars has been reduced from Rs. 450 to Rs. 300 per annum for science and from Rs. 150 to Rs. 100 per annum for humanities. The tuition fee for M. Phil students which was earlier fixed at Rs. 350 for both science and humanities has now been reduced proportionately. According to the new formula the fee now works out to be Rs. 1,000 for science and Rs. 500 for humanities.

The fee for Ph.D. registration and for the submission of synopsis of the thesis has been reduced from Rs. 100 and Rs. 300 to Rs. 50 and Rs. 200. In the implementation of these scales no distinction between stipendiary and non-stipendiary scholars will be made.

The Syndicate decided to request the Vice-Chancellor to negotiate with his counterparts in the Perarignar Anna University of Technology in order to maintain the level of admission available hitherto in the P.G. Hostel in A.C. College campus. Negotiations are also to be started with the management of Sri Venkateswara Hostel for accommodating research scholars in the hostel. A one-man committee has been constituted to look into the other requirements of research scholars.

There has been a drop in the number of students in affiliated colleges by 57,000 due to the shedding of the Pre-University course and the formation of the Perarignar Anna University of Technology. There was also a downward trend in the number of women students taking to collegiate education in the last few years.

Delhi plans for development of Colleges

In view of uneven growth of various colleges under Delhi University, a draft plan has been prepared by a committee appointed by the university to balance the development of colleges over the next ten years. The ten member committee would be headed by Mr. Mohinder Singh, Dean of Colleges. It has been reported that since the inception of the university colleges run by private trusts have flourished. Most of these colleges are on the main campus. Good students from all over the city tend to flock to the campus colleges with the result that the colleges in South, West and East Delhi face neglect both from the funding authorities and the university.

After carefully studying the problem of every college, the committee has suggested that within the next years all colleges must have buildings of their own. Introduction of honours and post graduate courses should also be equitably done in campus as well as non-campus colleges for their academic development.

The development plan prepared by the committee pointed out that the faculty, in most colleges, is practically of the same calibre. But the state of under-development of some colleges discourages students to come to them.

Divided into two phases, the plan envisages introduction of commerce honours courses to women's colleges in view of the growing popularity of the subject among them.

The draft plan has been sent to the colleges for their comments. It would soon be submitted to the UGC and the Ministry for necessary action.

Agra gets UGC grants

The University Grants Commission has agreed to provide Rs. fifty lakhs to Agra University for its development programmes during the Sixth Plan period. The university is busy in preparing schemes for the next five years and top priority will be given to enriching the libraries at different centres and expansion of the laboratory facilities. More than 50 per cent will be spent under this head and 20 to 25 per cent will be spent on meeting the staff requirements. The remaining amount would be utilised on the construction of new buildings. The university is understood to have decided that since the allocation was limited the affiliated colleges will not be benefitted under this programme and the amount will be spent to strengthen the teaching and research activities of the university. These institutes are: K.M. Hindi Institute, the Institute of Social Sciences and the Institute of Household Art and Science. An attempt will be made for greater coordination among the three teaching institutes.

The university has also decided to strengthen the library for research activities. It also decided to add teaching of library science in the university during Sixth Plan period. This means the university does not propose to include the correspondence courses for students and Tourism as a subject even during the next plan period.

The university is also preparing the blueprint of an ambitious plan of building residential houses, a modern guest house and a spacious hall for expanding university activities and for the benefit of girls studying at the Institute of Household Art and Science.

AIU brings out several Status Reports

A status report on grading in universities has been prepared by the Association of Indian Universities. It is found that about 128 institutions have adopted the grading system in 1970. The report is based on a detailed questionnaire survey. It showed that three-fourths of the universities faced no difficulties in switching from numerical marking system to one based on letter grade from E (Excellent) to F (Fail).

Sixty per cent of the university rarely received complaints from students against grading. But most universities have felt the need for a national body to determine the equivalence of grade and marks. The report said that numerical marking system provided a very inaccurate measurement of academical achievement and as a future action has called for the development of conceptual models of gradings system.

Another AIU report on student assessment said that as many as seven universities have no system of internal assessment at all and students are assessed by outsiders. The survey conducted by AIU revealed that in only 10 universities and four institutes the mode of assessment was fully internal. Rest of the universities have introduced in one form or the other, internal assessment giving it a weightage varying from 20 to 40 per cent. Universities whose students are assessed externally are: Bundelkhand, Jhansi, Guru Nanak, Rohilkhand, Bareilly, Saurashtra and Vikram and the universities of Calicut and Saugar. The report said that at present the performance of students was tested almost by the end-of-the-year test expected to produce stereotyped answers involving a great deal of memory.

Kasmir to amend the Universities Legislation

Mr. Mohammed Shafi, Minister of State for Education of Jammu & Kashmir made an announcement that the State Assembly will soon have a Bill to amend the Jammu & Kashmir Universities Act. The Bill provides for setting up of a joint University Council which will be the supreme authority of the two universities of the State. Among members of the Council will be four representatives of teachers, two from each university. For the first time the Bill seeks to provide a tribunal which will hear appeals against termination of service of the employees.

University teachers meets in Bangalore

The Federation of University and College Teachers' Association in Karnataka has planned to hold a State level convention of university and college teachers in Devangere. The convention is expected to discuss several issues of educational and social importance in six different sessions. Mr. S.S. Wodeyar, Vice-Chancellor, Karnatak University will inaugurate the convention and release the commemorative souvenir. Finance Minister Veerappa Moily will be the chief guest at the valedictory function.

Calcutta Election

Mr. Jyoti Bhusan Bhattacharya, former Education Minister and Head of the Department of English, Calcutta University, has been elected President of the Calcutta University Teachers' Association. Dr. Asis Ray, Reader, Department of Commerce, was elected General Secretary. Dr. Chandan Roy Choudhury, Mr. Dilip Bose, Mr. Kamal Ghosh and Mr. Sudin Mukherjee were elected Joint Secretaries.

Commonwealth Sports Trust in the offing

The setting up of a Commonwealth Games Sports Trust on the International Olympic Committee Solidarity Programme will be the main item on the agenda of the Federation Advisory Committee meeting of the Common-Wealth Games Federation in London. India will be represented on this meeting by Mr. Ashwini

Kumar. The proposed trust will go into the question of aiding member countries in respect of sports coaching and techniques and other financial assistance on the lines of Solidarity Programme of IOC.

Madras University

The Madras University will have a deficit of Rs. 63.95 lakhs if the State Government does not sanction grants to compensate the loss of income due to the shedding of Pre-University courses.

Jamnagar to start language centre

An Institute of Language Teaching and Research is likely to be set up at Jamnagar as part of the Saurashtra Education Foundation's endeavour to further education in the region. Mr. Amritlal Yagnik, convener of the Advisory Committee said in Bombay that the institute would teach English, Gujarati and Hindi placing special emphasis on the teaching of English which he said had no proper place in the region. He said that the institute would have a well-equipped language laboratory and library, research and reference facilities and audio-visual aids along the lines of other language institutes.

Initially the project would be undertaken at a local centre and would be shifted three years later to their own site. The whole project is estimated to cost Rs. 50 lakhs and would start with 60 students in the initial stages. The Foundation whose source of income is from donations proposes to start a centre of rural technology-cum-informal education to bring technological advancements to rural areas and a science centre to make science popular.

Sanskrit Institute demanded

A demand for the establishment of an Institute of Sanskrit Studies on the lines of the Institute of Kannada Studies was made at the last meeting of the Senate of Mysore University. Some members of the Senate said that the postgraduate departments of the university had neglected research. Efforts should be made to streamline its working. Similarly, a committee should go into the working of the Institute of Kannada Studies and Developmental Studies.

It was noted that the library had utilised the funds allocated but it needed more money for the purchase of books and journals.

Dr. K. S. Hegde, Vice-Chancellor of the university presided over the meeting.

Medical Research Centre in Manipal

Dr. Robert P. Goheen, U.S. Ambassador in India dedicated the Dr. T. M. A. Pai Research Centre in Manipal to the Kasturba Medical College.

Dr. Goheen referred to the missionary zeal of late Dr. Pai to promote the cause of education and particularly professional studies like medicine and engineering. Without depending on Government or other philanthropic agencies, Dr. Pai involved the people themselves in a big way in building up an educational and medical complex near Manipal. The research centre was a fitting memorial to Dr. Pai.

Dr. A. Krishna Rao, Dean of Kasturba Medical College said that the Medical Research Centre would include a library, central audio visual unit, a department of experimental medicine and surgery and a department of medical education.

Europeans and Maratha historiography

Dr. A.R. Kulkarni, Chairman, Indian Council of Historical Research while speaking at the SNDT Women's Universitiy campus on Maratha Historiography said that the European historians of the Marathas had played a prominent role. He discussed at length the contribution of Robert Orme, Sprangler, Scot Waring Elphinston, Grant Duff and Kincald Parsnis. He discussed the source material used by them for writing their books and also provided an insight into their methodology. Dr. G. M. Moraes referred to his contribution and his students to the Maratha Historiography. He mentioned that he has himself written a series of articles on the Maratha-Portuguese Relation. He has guided students like late Dr. Y. N. Deodhar for writing his thesis on Nana Phadnis, Dr. V. G. Hatalkar for the Maratha-French Relations, the late Mr. Sudha Desai for the Social History of Maharashtra and late Dr. Gaikwad for his thesis on Raghunath Rao. The meeting was presided over by Dr. P. M. Joshi.

Agricultural Engineering faculty likely for APAU

The Andhra Pradesh Agricultural University is considering a proposal to institute a faculty of agricultural engineering. A study team has already been appointed to go into the matter and on receipt of a report of this committee a decision will be taken after considering the problem in all its aspects.

Classified Advts

Continued from page 258

apply for more than one post must send their separate application for each post. Candidates will be called for interview at their own expense. Incomplete applications shall be rejected without making any reference.

Persons who have already applied in response to University Advt. Nos. 9/78, 1/79, 6/79, 7/79 and 10/79 need not apply afresh (except for the post of Professor of Business Administration and Reader in Psychology). They should intimate to the University that they are still desirous to be considered for the post applied for on the basis of their earlier application sent in response to the aforesaid advertisements. They may also send the particulars of their additional qualifications and experience etc. acquired and academic work done since then by them on plain paper by *19.5.1980.*

The University reserves the right to alter the number of posts in any cadre or subject. Higher start may be given to deserving candidates. Selected candidates are liable to be posted in any unit of the University. The University may consider anyone for appointment as Professor though he may not have applied for the post.

Persons who resorted to unfair means at any examination and were published therefor or were convicted by a court of law for any offence involving moral turpitude, are not eligible to apply. Retired persons also need not apply.

V. D. Qamra
REGISTRAR

Conferences, Seminars & Workshops

May—July 1980

Date	Title	Place	Sponsoring Body
4—25 May	Short term institute for teachers of English	Baroda	M.S. University of Baroda
5—17 May	Geotechnical engineering	Dhanbad	Indian School of Mines
5—19 May	Chemical process optimisation	Bangalore	Indian Inst. of Science
5—24 May	Summer Institute of English language teaching	Lucknow	Central Inst of English and Foreign Languages
5—24 May	Summer institute on pest management in cereals & millets	Hyderabad	AP Agricultural University
5—31 May	Contact course for P.G. certificate in teaching English	Hyderabad	Central Inst. of English and Foreign Languages
6 May—4 Jun	Summer Institute in advanced statistical methodology as applied to animal sciences	New Delhi	Indian Agric. Statistics Research Institute
12 May—10 Jun	Summer institute on forage crops improvement	Anand	Gujarat Agric. University and BA College of Agriculture
16 May—18 May	National Symposium on microchemical techniques	Mysore	University of Mysore
19 May—21 May	Annual workshop of coordinated scheme for micronutrients in soils and plants	Anand	Gujarat Agric. University and BA College of Agriculture
20 May—10 Jun	Summer school in astronomy and astrophysics	Bangalore	Indian Inst. of Science
26 May—6 Jun	Summer institute in English language teaching	Calcutta	Calcutta University
May 1980	Problems in second language teaching & the prospects of Hindi	Hyderabad	Dakshina Bharat Hindi Prachar Sabha
May 1980	Symposium on computers & their control	Lucknow	Inst of Electronics and Telecomm. Engineers
2 Jun— 6 Jun	Marketing of handicrafts	Delhi	Nat. Prod. Council
2 Jun—14 Jun	Mine environmental engineering	Dhanbad	Indian School of Mines
2 Jun—22 Jun	Course on project implementation	Delhi	I.I.T.
2 Jun—30 Jun	Summer Institute in ecology for better environment	Varanasi	Banaras Hindu University
4 Jun—10 Jun	Production management	Bangalore	Nat. Prod. Council
9 Jun—14 Jun	Quantitative techniques (Operations Research)	Srinagar	Nat. Prod. Council
9 Jun—14 Jun	Telemetry and telecommunication in mines	Dhanbad	Indian School of Mines
12 Jun— 3 Jul	Summer Institute in molecular inorganic chemistry	Bangalore	Indian Inst of Science
12 Jun—28 Jun	*Sound transmission in Coastal seas*	*Bangalore*	*Indian Inst of Science*
17 Jun—21 Jun	Corporate planning	Mussoorie	Nat. Productivity Council
20 Jun—24 Jun	Office administration	Ahmedabad	Nat. Productivity Council
23 Jun—27 Jun	Organisational behaviour	Madras	Nat. Productivity Council
23 Jun— 5 Jul	Mine safety engineering	Dhanbad	Indian School of Mines
26 Jun—28 Jun	Heat treatment (engineering)	Pune	Nat. Productivity Council
30 Jun— 5 Jul	Why Computer based information systems fail	Bombay	Nat Inst for Training in Industrial Engineering
30 Jun—12 Jul	Drilling engineering	Dhanbad	Indian School of Mines
2 Jul— 8 Jul	Materials management	Bangalore	Nat. Productivity Council
4 Jul—19 Jul	Cryogenic techniques I. Liquid Nitrogen.	Bangalore	Indian Inst of Science
4 Jul—19 Jul	Software engineering	Bangalore	Indian Inst. of Science
7 Jul— 8 Jul	Farm waste management	Chandigarh	Nat. Productivity Council
8 Jul—12 Jul	Management of Small Scale Industry	Gauhati	Nat. Productivity Council
14 Jul—19 Jul	Financial management for non-financial executives	Madras	Nat. Productivity Council
14 Jul—26 Jul	Surface mining	Dhanbad	Indian school of Mines
14 Jul— 2 Aug	Basic reservoir engineering	Dhanbad	Indian School of Mines
15 Jul—19 Jul	Tribology	Calcutta	Nat. Productivity Council
21 Jul—30 Jul	Operations research for managers in mining industry	Dhanbad	Indian School of Mines
22 Jul—26 Jul	Corrosion prevention and control	Ahmedabad	Nat. Productivity Council
22 Jul—26 Jul	Profit maximisation through cost reduction	Ahmedabad	Nat. Productivity Council
23 Jul—26 Jul	Marketing information system for engineering products	Bangalore	Nat. Productivity Council
24 Jul—27 Jul	Mid term symposium on electronics in industry	Chandigarh	Inst of Electronics and Telecomm. Engineers
28 Jul—9 Aug	Intensive course on power electronics	Dhanbad	Indian School of Mines
29 Jul—8 Aug	Quality engineering & management	Calcutta	Nat. Productivity Council
July 1980	Course in Medical virology	Pune	Nat. Institute of Virology
July 1980	Symposium on Electronics in industry	Chandigarh	Inst of Electronics and Telecomm. Engineers

Subject Index

Date	Title	Place	Sponsoring Body
Agriculture:			
19 May—21 May	Annual workshop of coordinated schemes for micronutrients in soils and plants	Anand	Gujarat Agric. University
7 Jul—8 Jul	*Farm waste management*	*Chandigarh*	*Nat. Productivity Council*
5 May—24 May	Summer institute on pest management cereals & millets	Hyderabad	AP Agricultural University
12 May—10 Jun	Summer institute on forage crops improvement	Anand	Gujarat Agric. University and BA College of Agriculture
Computers:			
May 1980	Symposium on computers & their control	Lucknow	Inst of Electronics and Telecomm. Engineers
30 Jun— 5 Jul	Why computer based information systems fail	Bombay	Nat. Inst. for Training in Industrial Engineering
Ecology & the Environment:			
2 Jun—30 Jun	Summer institute in ecology for better environment	Varanasi	Banaras Hindu University
Electricity and Electronics:			
28 Jul— 9 Aug	Intensive course on power electronics	Dhanbad	Indian School of Mines
24 Jul—27 Jul	Mid term symposium on electronics in industry	Chandigarh	Inst of Electronics and Telecomm. Engineers
July 1980	Symposium on Electronics in industry	Chandigarh	Inst of Electronics and Telecomm. Engineers
Engineering:			
14 Jul— 2 Aug	Basic reservoir engineering	Dhanbad	Indian School of Mines
22 Jul—26 Jul	Corrosion prevention and control	Ahmedabad	Nat. Productivity Council
30 Jun—12 Jul	Drilling engineering	Dhanbad	Indian School of Mines
5 May—17 May	Geotechnical engineering	Dhanbad	Indian School of Mines
26 Jun—28 Jun	Heat treatment (engineering)	Pune	Nat. Productivity Council
29 Jul— 8 Aug	Quality engineering and management	Calcutta	Nat. Productivity Council
4 Jul—19 Jul	Software engineering	Bangalore	Indian Inst of Schence
15 Jul—19 Jul	Tribology	Calcutta	Nat. Productivity Council
Language and Literature:			
5 May—31 May	Contract course for PG certificate in teaching English	Hyderabad	Central Inst of English and Foreign Languages
May 1980	Problems in Second language teaching and the prospects of Hindi	Hyderabad	Dakshina Bharat Hindi Prachar Sabha
4 May—25 May	Short term institute for teachers of English	Baroda	MS University of Baroda
26 May— 6 Jun	Summer institute in English language teaching	Calcutta	Calcutta University
5 May—24 May	Summer institute in English language teaching	Lucknow	Central Inst of English and Foreign Languages.
Management and Marketing:			
2 Jun—22 Jun	Course on project implementation	Delhi	I.I.T.
14 Jul—19 Jul	Financial management for non-financial executives	Madras	Nat. Productivity Council
8 Jul—12 Jul	Management of Small scale industry	Gauhati	Nat. Productivity Council
23 Jul—26 Jul	Marketing information system for engineering products	Bangalore	Nat. Productivity Council
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22 Jul—26 Jul	Profit maximisation through cost reduction	Ahmedabad	Nat. Productivity Council
9 Jun—14 Jun	Quantitative techniques (Operations Research)	Srinagar	Nat. Productivity Council
Materials Management:			
2 Jul— 8 Jul	Materials management	Bangalore	Nat. Productivity Council
Medicine & Public Health:			
July 1980	Course in medical virology	Pune	Nat. Inst. of Virology
Mining:			
2 Jun—14 Jun	Mine environmental engineering	Dhanbad	Indian School of Mines
23 Jun— 5 Jul	Mine safety engineering	Dhanbad	Indian School of Mines
21 Jul—30 Jul	Operations research for managers in mining industry	Dhanbad	Indian School of Mines
14 Jul—26 Jul	Surface mining	Dhanbad	Indian School of Mines
9 Jun—14 Jun	Telemetry and telecommunication in mines	Dhanbad	Indian School of Mines
Public Administration:			
17 Jun—21 Jun	Corporate planning	Mussoorie	Nat. Productivity Council
23 Jun—27 Jun	Organisational behaviour	Madras	Nat. Productivity Council
Science and Technology:			
5 May—19 May	Chemical process optimisation	Bongalore	Indian Inst of Science
4 Jul—19 Jul	Cryogenic techniques I. Liquid nitrogen	Bangolore	Indian Inst of Science
16 May—18 May	National symposium on microchemical techniques	Mysore	University of Mysore
12 Jun—28 Jun	Sound transmission in coastal seas	Bangalore	Indian Inst of Science
6 May— 4 Jun	Summer institute in advanced statistical methodology as applied to animal sciences	New Delhi	Indian Agric. Statistics Research Institute
12 Jun— 3 Jul	Summer Institute in molecular inorganic chemistry	Bangalore	Indian Inst. of Science
Space Research:			
20 May—10 Jun	Summer school in astronomy and astrophysics	Bangalore	Indian Inst of Science

Further details can be had from :
The Librarian, British Council Library
AIEACS Building, Rafi Marg, New Delhi-110001

THESES OF THE MONTH

A list of Doctoral Theses Accepted by Indian Universities

SOCIAL SCIENCE

Psychology

1. Bandyopadhyay Tapen. High achievers: Their psychology and environment. University of Calcutta.

Sociology

1. Singh, Ram Sagar. Rural leadership entrepreneurship *and social change : A sociological study of Bilariaganj* block in Azamgarh district. Jawaharlal Nehru University.

Political Science

1. Chaudhuri Sailendranath. A study of socio-psychological factors influencing chronic industrial absenteeism. University of Calcutta.

2. Pandey Keshavdas. Emergence of Bangladesh and its impact on mutual relations between China, the U.S.A. and India. Jiwaji University.

Economics

1. Mathur Badri Prasad. Economic development of Shivpuri district of Gwalior division: A case study of a backward region. Jiwaji University.

2. Ramarao, Gazula Dasaradha. Agricultural labourers in Andhra Pradesh : An analysis of wages and employment. Andhra University.

Law

1. Jain Subhash Chander. Expropriation of alien property and the problem of compensation. Jawaharlal Nehru University.

Education

1. Sarma Ajit Kumar. A critical study of the achievement in mathematics by pupils of secondary schools with particular reference to the state of Assam. Gauhati University.

2. Singh Rajendra Pal. A study of creativity in relation to adjustment frustration and level of aspiration. Agra University.

Commerce

1. Ray Malay Kanti. Decision oriented accounting model for an organisation having open system characteristics. University of Calcutta.

2. Singh Jagdish Dayal. Marketing planning: A comparative study of public and private sectors in India. University of Delhi.

3. Vaish, Prakash Narain. Management of working capital in cotton textile industry of M.P. Jiwaji University.

HUMANITIES

Philosophy

1. Chattopadhyay Gangasankar. Ends and means. University of Calcutta.

2. Goswami Krishna. Concept of the individual self (Jivatman) in Nyaya Philosophy. University of Calcutta.

3. Koves Margit. A comparative study of the Suvaranaprabhasa in Turkish and Tibetan versions. University of Delhi.

Linguistics

1. Bhasin Sharda. A contrastive study of Hindi and Japanese word phonology. University of Delhi.

Literature

English

1. Prem Nath. A study of Dr. Johnson: The artists in the light of his own critical principles. University of Delhi.

2. Singh Shyam Narain. Pattern of tragedy in the novels. Magadh University.

Sanskrit

1. Agrawal Krishna Mohan. Indian culture as depicted in the Kadambari of Bana. *D. Litt.* Magadh University.

2. Das Ananta Charan. Studies in the Sulochana Madhava mahakavyam. Utkal University.

3. Ouseparampil, J.M. Gender in Sanskrit : A philosophical study in comparison with other Indo-European languages. Sri Venkateswara University.

4. Samajder Madhabi. An introduction to the study of Samkhya. University of Calcutta.

5. Shanno Devi. Vopdeva ka Sanskrit vyakarana ko yogdan. University of Delhi.

Hindi

1. Dubey Nira. Ashtchap ke kaviyon mein sangitatmakta. Jiwaji University.

2. Govila Vimla. Bhaktikalin Ram kavya mein abhivyanjana shilp. University of Jammu.

3. Gupta Mridula. Tulsi kavya mein loktatwa. University of Delhi.

4. Jain Hem Chand. Swatantryottar Hindi upanyason mein nayak kee sthiti, 1947 to 1975. University of Delhi.

5. Ramakrishna Naicar, Kamadi Bala. Dharmaveer Bharti kee kritiyon mein manavatavad. Andhra University.

6. Sharma, Haricharan. Dushyant Kumar aur unka sahitya. Jiwaji University.

7. Tiwary, Ramnath. Adhunik Hind ikavya mein Ramkatha. University of Calcutta.

Urdu

1. Khan, Anwar Ahmed. Khushi Mohammad Naazir aur Kashmir mein Urdu shairika irtiqa. University of Delhi.

2. Taqi, Yousuf R. Different trends in Urdu nazm. University of Calcutta.

Persian

1. Nasrin Jahan. A study of pro-Mughal histories written in Persian prose in India. University of Calcutta.

Bengali

1. Chattopadhyay, Ramram. Adhunik Bangla kabitar sabda-o-alankar. University of Calcutta.

2. Sarkar, Ajayondranath. Unish satakor samaj sanskar andalan-o-vitarka sahitya. University of Calcutta.

Telugu

1. Bapi Reddy, N. A critique on prabhavathi pradyumnamu. Nagarjuna University.

2. Lakshipathi Rao, Vakkalanka. Paarijaathapaharana *prabandha sowndarya samiksha. Andhra University.*

3. Ramanadham, Chinta. Kuchipudi School of Yakshgana: A historical, literary and technical perspective. Andhra University.

Geography

1. Ghosal, Kalpana. Growth and development prospects of cottage industries of Murshidabad district. University of Calcutta.

2. Khan, Dilip Kumar. Agro-industries of the district of Twenty Four Parganas: An analytical study. University of Calcutta.

History

1. Bhattacharyya, Kanailal. Sarasvati: A study in conceptual and iconographical development. University of Calcutta.

2. Mukhopadhyay, Mihirmohan. Sculptures of the Ganga-Jamuna valley, C.A.D. 750-1200. University of Calcutta.

3. Nag, Anita. Influence of Vedanta on Vaishnavism. University of Calcutta.

CURRENT DOCUMENTATION IN EDUCATION

A list of select articles culled from periodicals received in AIU Library during April, 1980

EDUCATIONAL PHILOSOPHY

Billerbeck, Wolfgang. "What is the value of the school ". *IUS Magazine on the Democratisation and Reform of Education* (2); 1979: 44-8.

Joshi, Ram. "Research and education: Linkage in universities". *University News* 18(4); 15 Feb 80: 83 4 89.

O'Keeffe Dennis J. "Capitalism and correspondence: A critique of Marxist analysis of education". *Higher Education Review* 12(1); Autumn 79: 40 54.

EDUCATIONAL PSYCHOLOGY

Hoge, Robert D and Luce Sally, "Predicting academic achievement from classroom behaviour". *Review of Educational Research* 49(3); Summer 79: 479 96.

Neumann Yoram. "Predicting faculty job satisfaction in university departments". *Research in Higher Education* 9(3); 1978: 261 75.

EDUCATIONAL SOCIOLOGY

Boudon Raymond. "1970s in France: A period of student retreat". *Higher Education* 8(6) Nov 79: 669-81.

Demaine Jack. "Iqism as ideology and the political economy of education". *Educational Studies* 5(3); Oct 79: 199 215.

"STRUGGLE AGAINST neo-colonialist penetration into the educational system: Report of the International Student Seminar on the contribution of students to the struggle for a democratic education geared toward economic independence and social progress. Togo. 1979". *IUS Magazine on the Democratisation and Reform of Education* (3); 1979: 2-9.

EDUCATIONAL PLANNING

Mathur Gautam. "Active education for manpower development". *Manpower Journal* 15(2); July—Sept 79: 11 24.

Wiseman Charles. "New foundations for planning models". *Journal of Higher Education* (Ohio) 50 (6); Nov—Dec 79: 726 44.

EDUCATIONAL ADMINISTRATION

Baldridge J. Victor. "Impacts on college administration: Management information systems and management by objectives systems". *Research in Higher Education* 10(3); May 79: 263 82.

Griffith John, "why the lessons of Gould must not be forgotten". *Times Higher Education Supplement* (385); 7 Mar 80: 11.

Hoyt Donald P. and Spangler, Ronald K. "Measurement of administrative effectiveness of the academic department head". *Research in Higher Education* 10(4); June 79: 291 303.

Minogue Kenneth. "Privilege, independence and a confused equation". *Times Higher Education Supplement* (385): 7 Mar 80: 11 12.

Rais Ahmed. "University research and national development". *University News* 18(4); 15 Feb 80: 87 8.

Srivastava R.C. "Participation practices and faculty and student satisfaction". *EPA Bulletin* 2(2); July 79: 62 9

Sukumaran Nayar V.K. "Management of research in universities". *University News* 18(4); 15 Feb 80: 85 6.

CURRICULUM

Jolly W.P. and Turner C.W. "Transition from school to University: Some experimental induction programmes for engineering students". *Studies in Higher Education* 4(1); Mar 79: 39 46.

"TEACHING AND research in anthropology in South Indian Universities". *Bulletin:Madras Development Seminar Series* 10(2); Feb 80: 107 13.

TEACHING

Bazdugan Gheorghe. "Pedagogy of technical higher education: Its possibilities and limits". *Higher Education in Europe* 4(4); Oct—Dec 79: 36-9.

Woodbury Rebert L. "Organisational change and the improvement of university teaching". *Studies in Higher Education* 4(2); Oct 79: 255 9.

EDUCATIONAL RESEARCH

Dill David D. and Friedman Charles P. "Analysis of frameworks for research on innovation and change in higher education". *Review of Educational Research* 49(3); Summer 79: 411-35.

EDUCATIONAL TECHNOLOGY

Pronay Nicholas. "Towards independence in learning history: The potential of video cassette technology for curricular innovation". *Studies in Higher Education* 4(1); Mar 79: 27-30.

EVALUATION

Clift J.C. and Imrie B.W. "Design of evaluation for learning". *Higher Education* 9(1); Jan 80: 69 80.

Husen Torsten. "International research venture in retrospect: The I.E.A. Surveys". *Comparative Education Review* 23(3); Oct 79: 371-85.

Murphy Roger J.L. and Adams Robert M. "Some observations on the problems of grading examinations with several components: A reply to P.J. Squire" *Educational Studies* 5(3); Oct 79: 225-30.

ECONOMICS OF EDUCATION

Conger Cathleen A. "Building an accurate financial data base". *New Directions for Higher Education* 7(2); 1979: 67-73.

Datta Bhabatosh. "State support to research in universities". *University News* 18(6); 15 Mar 80: 131-2 134.

Dickmeyer Nathan. "First steps in financial analysis". *New Directions for Higher Education* 7(2); 1979: 41-5.

Foster Edward and Rodgers Jack. "Quality of education and student earnings". *Higher Education* 8(1); Jan 80: 21-37.

Frances, Carol and Stenner, A. Jackson. "Analysing the financial state of colleges and universities". *New Directions for Higher Education* 7(2); 1979: 1-14.

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"PATTERN OF expenditure and per student cost of degree and diploma courses in engineering and technology in India: Summary" *Manpower Journal* 15(2); July—Sept 79: 1-10.

Sethi J.D. "Coping with new economic order : Third world tasks". *EPA Bulletin* 2(3-4); Oct 79—Jan 80: 68-74.

ADULT EDUCATION

Amrik Singh. "Adult education as liberation". *New Quest* (19); Jan—Feb 80: 21-6.

Chambers M.M. "Obstacles to the implementation of principle of life long education in higher education". *Higher Education in Europe* 4(4); Oct—Dec 79: 11-13.

COMPARATIVE EDUCATION AND COUNTRY STUDIES

Bhandari R.K. "Education in the draft sixth plan: A review". *EPA Bulletin* 2(3-4); Oct 79-Jan 80: 75-84.

Shah A.B. "Priorities in education". *New Quest* (18); Nov—Dec 79: 335-6.

"STRUCTURE AND aims of the GDR's educational system". *World University News* 33(11); 1979: 10-11.

JAWAHARLAL NEHRU UNIVERSITY
NEW DELHI

Advertisement No. Aca. III/3/80

Applications are invited for the following posts :

I. SCHOOL OF SOCIAL SCIENCES
Centre for Historical Studies:

1. **Professor/Sr. Fellow in Medieval Indian History**

Essential Qualifications:

(a) Consistently good academic record with at least a high second class Master's degree in History or an equivalent qualifications from an Indian/Foreign University;
(b) A doctor's degree or published work of an equally high standard; and
(c) About ten year's experience of teaching and/or research.

Area of Specialization : Medieval Indian History

2. **Assistant Professor in Medieval Indian History**

Essential Qualifications:

(a) Consistently good academic record with at least a high 2nd class Master's degree in History with specialization in Medieval Indian History or its equivalent qualification from an Indian/foreign University; and
(b) A doctor's degree or published work of a n euaally high standard.

Desirable: Knowledge of Persian languvge.

II SCHOOL OF LANGUAGES:
Centre of Linguistics and English :

3. ***Assistant Professor of English Language & Literature*—(Leave vacancy).**

Essentialaqualifications:

(a) Consistently good academic record with at least a high IInd class Master's degree in a relevant discipline or its equivalent qualification from an Indian/foreign University; and
(b) A doctor's degree or published work of an equally high standard.

Area of Specialisation: English Literature (20th Century Novel) and English as a Foreign Language.

Centre of Russian Studies :

4. **Assistant Professor in Russian**

Essential Qualifications:

(a) Consistently good academic record with at least a high second class Master's degree in Russian or its equivalent qualification from an Indian/foreign University;
(b) A doctor's degree or published work of an equally high standard.

Specialisation required: Russian Language, translation and interpretation.

Desirable: Experience of teaching Russian, translation/interpretation at degree level.

Provided that in the case of Assistant Professors if the Selection Committees are of the View t3at the research work of a candidate as evident either from his thesis or from his published work is of very high standard, it may relax any of the qualifications prescribed in (a) above.

Provided further if a candidate possessing a Doctor's degree or equivalent research work is not available or is not considered suitable a person possessing a consistently good academic record (weightage being given to M. Phil or equivalent degree or research work of quality) may be appointed provided he/she has done research work for at least two years or has practical experience in a research laboratory/organisation on the condition that he will have to obtain a Doctor's degree or give evidence of research work of equivalent high standard within five yeasr of his appointment, failing which he will not be able to earn future increments until he fulfils these requirements.

Centre of German Studies :

5. **Technical Assistant** : Two (Temporary) **(one reserved for Scheduled caste candidate).**

Essential Qualifications:

(a) Graduation (B.A./B.Sc.)
(b) Diploma or equivalent qualification in any area of Audio-Visual Technology; and
(c) At least one year experience in dealing with audio-visual teaching aids.

Desirable : *Proven ability to repair* and maintain language laboratory equipment.

Scales of Pay:

1. Professor/Sr. Fellow : Rs. 1500-60-1800-100-2000-125/2-2500.
2. Assistant Professor : Rs. 700-40-1100-50-1600.
3. Technical Assistant : Rs. 425-15-500-EB-15-560-20-700.

Relaxation in any of the qualifications may be made (a) in favour of persons of eminence or of high academic *professional distinction, and* (b) in exceptional cases where adequately qualified persons are not available but are otherwise found suitable for the respective positions. It will also be open to the University to consider the names of suitable candidates who may not have applied.

The selected candidates will be expected to participate in the teaching and research programmes in concerned disciplines in other Schools of the University as well as in the programmes offered in their own Centres of Studies.

Benefits of C.P. Fund-cum-Gratuity /G.P. Fund-cum-Pension-cum-Gratuity are available as per University rules.

Persons already in employment should route their applications through proper channel.

Due consideration will be given to candidates belonging to SC/ST at the level of Assistant Professor.

For Technical Assistant:

(i) Age limit 40 years; relaxable by 5 years in respect of candidates belonging to Scheduled Castes & Scheduled Tribes/Ex-Servicemen/*Physically handicapped* candidates.
(ii) Upto 1% of the vacancies are reserved each for deaf, blind and orthopaedically handicapped, in Group C & D (class III & IV posts).

Second class (*mail*) rail fare (both ways) will be paid to candidates invited to appear for interview from outstation by the shortest route subject to the production of rail receipt.

Applications separate for each post, on the prescribed form, obtainable free of cost from the University by sending a self-addressed and stamped envelope (affixing Postage Stamps worth Rs. 2.85) of 23 cm x 10 cm. size to the Deputy Registrar (Academic), Jawajarlal Nehru University, New Mahrauli Road, New Delhi-67, should reach him latest by **2nd June,** 1980.

candidates from abroad, applying for the faculty positions, may apply on plain paper, (but their applications should reach the University by the last date) furnishing all the relevant informations such as their name, date and place of birth, marital status, nationality; state of domicile; postal and permanent address; father's name and address; academic and professional attainments; full details of (a) publications, and (b) research projects undertaken; language (s) known; details of visits to foreign countryies; and the names and addresses of a tleast two persons well acquainted with the candidates' professional work who should also be requested by the candidate to forward to the Deputy Registrar (Academic) confidential report concerning the candidate.

UTKAL UNIVERSITY

Advertisement No Estt I/926-C/8054/80, Dated 21-4-80

Applications in Seven Copies are invited in the prescribed form alongwith attested copies of certificates and marklists of all examinations passed for the post of Professor of Institutional Finance in the P.G. Department of Analytical and Applied Economics of the University on or before 15-5-80.

P.G. Department : Analytical and Applied Economics
Post : Professor-I (Temporary)

Scale *of* Pay:

Professor : Rs. 1500-60-1800-100-2000-125/2-2500/- Higher initial salary can be given in case of highly suitable candidates.

Age of Superannuation : 60 years.

Essential Qualifications:

Professor: The Professor shall :

(i) be a Scholar of eminence.
(ii) Possess a good academic record with First or High Second Class Master's Degree in Economics. In cases of other suitably quali-

fied candidates, the High Second class at M.A. may not be insisted upon;

(iii) have a Doctorate Degree of published work of equivalent Standard;

(iv) have independent published research work of high standard in addition to the published work mentioned in (iii) above.

(v) be engaged in active research and have experience of successful supervision of doctoral research in Institutional Finance.

(vi) be teacher for ten years out of which at least seven years should have been spent in regular teaching in Post-graduate/Honours classes.

Desirable, preference will be given to one who has specialisation in Institional Finance, Published some research work of high standard in the field and experience in guiding research work in the subject, Institutional Finance

Prescribed application forms can be had from the Registrar, Utkal University person on payment of Rs. 7.49 including local sales tax (Rupees Seven and paise fortynine) only or by post on receipt of a Crossed Indian Postal Order for Rs 9/-. (Rupees nine) only payable to the Registrar, Utkal University, Vani Vihar, Bhubaneswar-4.

Candidates in Govt. service, if selected for the posts for which they have applied would be asked to pay Pension contribution and leave salary in case they join the University Service on foreign service terms and conditions.

REGISTRAR

INDIAN INSTITUTE OF TECHNOLOGY

KANPUR

Advertisement No. 11/80

Applications are invited for three posts of Senior Scientific Officer I and two posts of Senior Scientific Officer II in the Department of Aeronautical Engineering, Civil Engineering, Physics and Central NMR Facility of the Institute in the following pay scales :

Senior Scientific Officer I : Rs. 1100-50-1600.

Senior Scientific Officer II : Rs. 700-40-900-EB-40-1100-50-1300.

DEPARTMENT OF AERONAUTICAL ENGINEERING—

Post : Senior Scientific Officer II—one post.

Qualifications: First class B. Tech. degree in Electrical Engineering with specialization in Electronics.

Desirable: M. Tech. degree in Electrical Engineering with specialization in Electronics.

Experience

Essential: Minimum of two years experience in commissioning and maintenance of electrical and electronics systems and design of digital circuits.

Desirable: Background of hardware and software design of computer interfaces. Knowledge of computer programming with special emphasis on BASIC. Exposure to use of mini computers in a real time operating system.

DEPARTMENT OF CIVIL ENGINEERING:

Post : Senior Scientific Officer I—one post

Qualifications:

Essential: Ph.D. degree in Geology with five years of experience in an educational institution. The selected candidate is expected to assist in research programmes in the Department of Civil Engineering in Engineering Geology, Ground Water and other related areas.

Desirable: (1) Aquaintance with Techniques like x-ray diffraction and differential thermal analysis.

(2) Research publications.

LASER LABORATORIES, DEPARTMENT OF PHYSICS :

Post : Senior Scientific Officer I—two posts.

Qualifications: Ph.D. in Physics plus three years experience in Lasers.

OR

M. Tech. in Electrical Engineering plus four years experience in Lasers. Additional experience in thin films and vacuum coating or in crystal growth or in scientific instrumentation is desirable.

CENTRAL NMR FACILITY (FOURIER TRANSFORM NMR LABORATORY)

Post : Senior Scientific Officer II—one post.

Qualifications : Candidates must have at least B.E./B. Tech. degree in Electrical Engineering with specialization in Electronics.

Preference will be given to candidates with experience in the maintenance and operation of FT-NMR spectrometer systems and also familiar with electronics and computer hardware and software associated with NMR systems.

The posts are contractual for a period of three years initially, extendable by a further three years at the end of which the candidate is eligible for consideration to a permanent post, and carry benefits in the shape of CPF Scheme. Besides pay, the posts carry allowances according to the Institute rules, which at present correspond to those admissible to the Central Govt. employees stationed at Kanpur. Higher initial pay is admissible to exceptionally qualified and deserving candidates. Candidates called for interview will be paid second class railway fare from the place of duty to Kanpur and back by the shortest route.

In the category of Scientific Officer II, one post will be reserved for SC/ST candidates. In the event of non-availability of SC/ST candidates, the reserved post would be treated as deserved.

Applications from persons in India should be made on prescribed form obtainable free of charge from the Registrar of the Institute by sending a Self-addressed unstamped envelope of 25 cm x 10 cm size. Applications should be accompanied by a Postal order of Rs 7.50 (Rs. 1.87 for SC/ST candidates).

Persons from abroad may apply on plain paper along with a complete biodata and names of three referees from whom reference letters may be obtained.

Applicants who are employed in a Government/Semi Government organisation or Institute, should send their applications through proper channel, else they will be required to produce a 'No Objection' certificate from their employers at the time of interview.

Applications should reach the Registrar, Indian Institute of Technology IIT Post Office, Kanpur-208016 (U.P.) India on or **before May 24, 1980**.

BIDHAN CHANDRA KRISHI VISWA VIDYALAYA

P.O. MOHANPUR, WEST BENGAL

Corrigenda in Respect of Advertisement No. Apptt/3/80

(i) Category 'A' should be read as Reader in Agronomy (two posts-one against a lien vacancy) instead of Reader in Agronomy (two posts)

(ii) Category 'D' should be read as Lecturer in Agril. Statistics/Genetics & Plant Breeding/Agril. Engineering (one post each) instead of Lecturer in Agronomy/ Genetics & Plant Breeding/Agril. Engineering (one post each).

(iii) For category 'E' administrative experience including office management and supervision of staff is desired.

(iv) For category 'B', 'D', 'G', 'H', & 'I'—if a candidate possessing Doctorate Degree or equivalent research work is not available or is not considered suitable, the person possessing consistently good academic record may be considered for appointment, on the condition that he/she will have to attain a Doctorate Degree or show evidence of research work of equivalent high standard within 5 years of his/her appointment failing which he/she will not be eligible to earn increments till he/she fulfils these requirements.

A.K. Mitra
REGISTRAR (Actg.)

9039

OSMANIA UNIVERSITY

HYDERABAD—50 0007, (A.P.)

Advertisement No. 4/80

Applications, in the prescribed form together with the registration fee of Rs. 5/- through M.O./I.P.O./Challan 'A' are invited for the following posts in the University service, so as to reach the undersigned on or before **10th May,** 1980.

1. Professor of Econometrics
2. Professor of Education

Scale of pay : Rs. 1500-60-1800-2000-125/2-2500.

3. Lecturers in Commerce (lien vacancies)
4. Lecturers in Telugu

Scale of pay: *Rs. 700-40-1100-50-1600.*

5. Research Assistant
Consolidated salary of Rs. 400 -p.m.

Age:
Professors —Not above (50) years
Lecturers —Not above (35) years
Research Asst. —Not above (30) years

Note :

(1) Age limit does not apply to the employees of this University.
(2) Relaxation in age to the extent of five years may be granted to *candidates belonging to SCs*, Sts and BCs, respectively in the case of Lecturers only.
(3) Age relaxation can be considered in deserving cases.

14%, 4% and 25% reservations are made for SCs, STs, and BCs respecively in case of Lecturers only.

Application forms can be had from the Director, Dept. of Publications and University Press, Osmania University, Hyderabad-7, A.P., on payment of Rs. 4.50 in person or by money order or by a postal order UNCROSSED made payable to the Director and by sending a self-addressed envelope (11 ½ x 26 ½ cms) duly stampted for ordinary or registered post.

A latest passort size photograph should be affixed on the application form. **No original certificates should be enclosed to the application form.**

Full particulars can be obtained on requisition from the Director, Osmania University Press, **free of cost,** by sending a self-addressed stamped envelope.

B. Ramachandra Reddy
REGISTRAR

OSMANIA UNIVERSITY
HYDERABAD-500 007, (A P.)
Advertisement No. 6/80

Applications in the prescribed form together with the registration fee of Rs. 5/- through M.O./I.P.O./Challan 'A' *are invited for the following posts* in the University service, so as to reach the undersigned on or before **19th May, *1980.***

I. Readers in Arabic / English / Kannada / Linguistics / Islamic Studies / Marathi / Telugu/Tamil/ Astronomy / Botany / Chemistry/ Physics/Bio-Chemistry / Zoology/ Economics/History.
II. Readers in Civil Engineering / Mechanical Engineering/ Electronics & Communication Engineering.
III. Readers in Technology.
IV. Readers in Education.
V. Lecturers in Chemistry/History.
VI. Reader in Physics—Godavari Khani
VII. Readers *in Chemistry—Bhiknur*
VIII. Readers in Geology—Kothagudem (P.G. Courses at District Centres.)
IX. Reader *in* Chemistry—Kothagudem School of Mines, Kothagudem.

Scale of Pay:
Readers—Rs. 1200-50-1300-60-1900
Lecturers—Rs. 700-40-1100-50-1600
Age: Readers—Not above (40) years.
Lecturers—Not above (35) years.

Note:

i) Age limit does not apply to the employees of this University.
ii) Age relaxation can be considered in deserving cases.

Application forms can be had from the Director, Department of Publications and University Press, Osmania University, Hyderabad-500 007, A.P. on payment of Rs. 4.50 in person or by money order or by a postal order *UNCROSSED made payable to the* Director and by sending a self-addressed envelope (11½ x 26½ cms.) *duly stamped for ordinary or registered* post.

A latest passport size photograph should be affixed on the application form. No original certificates should be enclosed to the application form.

Full particulars can be obtained on requisition from the Director, Osmania University Press, free of cost, by sending a self-addressed stamped envelope.

B. Ramachandra Reddy
REGISTRAR

TULJARAM CHATURCHAND COLLEGE
BARAMATI-413 102
P. B. No. 51, DIST. PUNE
(Affiliated to Poona University)
Advertisement

Applications are invited for the *following posts in this College, in the* prescribed form obtainable from this College on payment of Rs. 2/- and a self addressed stamped (30 Ps) envelope (9" x 4"). Amount of Rs. 2/- may be remitted by Indian Postal Order or by M.O. or in cash. The prescribed application form duly filled in should reach in this office on or before 15-5-1980.

FUL-TIME LECTURERS in English, Botany, Commerce, Economics, Politics, History, Chemistry-(Organic ond Inorganic), Geography, Psychology, Statistics, PART-TIME LECTURER in Accountancy.

For Politics, Commerce, English, *Hindi, History,* Accountacy, Economics candidates recognised or recognisable to teach Post-Graduate Classes will be preferred.

Qualifications

First or High Second Class or B (B plus) grade at Master's Degree and M.Phil or Ph.D.

Pay Scale: Rs. 700-40-1100-50-1600.

BHOPAL UNIVERSITY
BHOPAL
CORRIGENDUM
No. 2039/Estt./BU/80
Dated 19-4-1980

In this University advertisement No. 3/80 relating to the post of Deputy Registrar (Development) the minimum of the scale of pay may be read as Rs. 700/- instead of Rs. 750/-.

M. G. Paithankar
REGISTRAR

UNIVERSITY OF RAJASTHAN
JAIPUR
Advertisement No. 9/80

APPLICATIONS are invited (through proper channel in case of those who are already in employment) so as to reach *this office* on or before Monday the 19th may, 1980 in the prescribed form available from the Registrar's office on *pre-payment of Rs. 4/- (Rs. 3/- extra* in case required by post) for the undermentioned posts (including the posts in the Institute of Correspondence Studies and Continuing Education:—

1. **Professors**: In the scale of Rs. 1500-60-1800-100-2000-125/2-2500. Tagore Professor in History and Indian Culture—1; Professor *in History—1; Public Administra*tion—1; Physical Chemistry—1; Mathematics—1; Jain Studies—1 and Business Administration—1.
2. **Readers**: In the scale of Rs. 1200-50-1300-60-1900. Law—1; Public Administration — 1; Political Science—*1*; *Psychology—1*; *Socio*logy—2; Dramatics—1 and Economics—1.
   *(The above posts of Readers in*clude one post each in the subjects of Economics, Public Administration & *Sociology* for the Institute of Correspondence Studies and Continuing Education and the same are temporary but likely to be made permanent).
3. **Lecturers**: In the scale of Rs. 700-40-1100-50-1600. Economics—5; History—6; Public Administration —2; Dramatics—3; South Asia Studies Centre—1; Zoology—2 and Business Administration—7.
   (The above posts of Lecturers are inclusive of the vacancies in the Institute of Correspondence Studies & Continuing Education. They are Economics—3; History—2; *Public Administration*—2 and Business Administration—5 and the same are temporary but likely to be made permanent).
4. **Case Analyst**—1 in the scale of Rs. 400-40-800-50-950.
5. **Research Associates:** In the grade of Rs. 700-40-900-EB-40-1100-50-1300. Economics—1; History—3; Sociology—1 and South Asia Studies Centre—2.
6. **For University Leadership Project *in Political Science:—(Temporary*** but likely to be made permanent):-
   i) Reader—1 in the grade of Rs. 1200-50-1300-60-1900.
   ii) Lecturer (Translation)—1 in the grade of Rs. 700-40-1100-50-1600.
7. For University Service and Instrumentation Centre (Temporary but likely to be made permanent):—
   i) Senior Scientific Offices—1 in the grade *of Rs. 1100-50-1600.*
   ii) Scientific Offices—2 in the grade of Rs. 700-40-900-EB-40-1100-50-1300.

The details of qualifications etc. may be obtained along with the prescribed application form or separately as the candidate may desire. The benefits of Provident Fund, D.A. and other allowances will be admissible as per rules of the University. Candidates desiring to

(Continued on page 251)

SAMBALPUR UNIVERSITY

JYOTI VIHAR, BURLA
SAMBALPUR
Pin. : 768017

Advertisement No. 5732 Estt-II
Dated 28-4-80

Applications, alongwith attested copies of marksheets and Certificates of all examinations passed in the prescribed from are invited for appointment of Principal in University College of Engineering, Burla.

I. **Scale of pay** : Rs. 1500-60-1800-100-2000-125/2-2500 -
II. The post carries usual Dearness Allowance and C.P.F.—cum-gratuity benefit as would be determined by the University from time to time.
III. The age of retirement is 60 years.
IV. **Qualification:**
(1) A First Class Master's Degree/Doctorate Degree in Civil/Mech./Electrical/Electronics & Telecommunication Engg. with a minimum of 10 years experience in teaching and/or research out of which at least 5 years shall be teaching in an Engineering College/University.
(2) Experience in guiding Research.
(3) Professional/Scientific work of outstanding merit will be preferred.

In addition to the above, the candidate should have administrative experience of some years to give proper administrative guidance to the College.

Seven copies of the application forms will be supplied from the University office to each candidate in person on cash payment of Rs. 15/- (Rupees fifteen) only. Candidates intending to receive forms by post are required to send(a) crossed Postal Order of Rs. 15/- payable to the 'FINANCE OFFICER, SAMBALPUR UNIVERSITY'. (b) a self addressed envelope (23 cm x 10 cm.) with postage stamps worth Rs. 3.30 p. affixed to it with the words "APPLICATION FORM FOR TEACHING POSTS IN SAMBALPUR UNIVERSITY" superscribed on it. Money Order/Cheque will not be accepted.

The last date for receipt of applications in the office of the University is **Dt. 15-5-1980.** The candidates will be required to appear for an interview before a Selection Committee at their own expense.

Issue of this advertisement does not make it binding on the University to make the appointment.

All communications should be addressed to the Registrar by designation only.

I.N. Panda
REGISTRAR

SHREEMATI NATHIBAI DAMODAR THACKERSEY WOMEN'S UNIVERSITY

BOMBAY-400 020

Applications are invited on prescribed forms available from the University Office on payment of Rs. 5/- (by M.O. or cash) for the following posts to be filled in at the Sir Vithaldas Thackersey College of Home Science, located at Juhu Campus of the University, so as to reach the undersigned before **May 21, 1980.** The medium of teaching is English.

I. **Post-Graduate Department**
   1. **PROFFSSOR** in Child Development: One Post
   2. **READER** in Foods & Nutrition : One Post
II. **College level**
   LECTURERS in Textiles & Clothing : Four posts

Qualifications

Professor: An eminent Scholar with published work of high quality, actively engaged in research—ten years experience of teaching and/or research in Child Development-experience of guiding research at doctoral level.

OR

An out-standing scholar with established reputation who has made significant contribution to knowledge in the above specialisation.

Reader: Good academic record at Bachelors and Master's level in Foods & Nutrition, at least with first or high second class with a doctoral degree or equivalent published work in the subject. Evidance of being actively engaged in (i) research or (ii) innovation in teaching methods or (iii) production of teaching materials. 5 years experience and/or research provided that at least 3 of these years were as lecturer or in an equivalent position. The condition may be relaxed in the case of candidates with outstanding research work.

Lecturers:

(a) Consistently good academic record with at least first or high second class at the Master's level in the subject concerned or an equivalent degree of a foreign University; and

(b) An M. Phil. Degree or a recognised degree beyond the Master's level or published work indicating the capacity of a candidate for independent research work.

Note:

(1) Provided that if the Selection Committee is of the view that the research work of a candidate as evident either from his/her published work is of very high standard, it may relax any of the qualifications prescribed in (a) above.

(2) Provided further that if a candidate possessing the qualifications at (a) above is not available or not considered suitable the college, on the recommendation of the Selection Committee may appoint a person possessing a consistently good academic record on the condition that he/she will have to obtain an M. Phil. Degree or a recognised degree beyond the Master's level with five years of his/her appointment, failing which he/she will not be able to earn future increment until he/she obtains that degree or gives evidence of equivalent published work of high standard.

Salary Scales:

Professor: Rs. 1500-60-1800-100-2000-125/2-250 + admissible allowances. (Total initial emoluments about Rs. 2100/- p.m.)

Reader: Rs. 1200-50-1300-60-1900 + admissible allowances (Total initial emoluments about Rs. 1830/- p.m.)

Lecturer: Rs. 700-40-10-1100-50-300-Assessment-50-1600 + admissible allowances (Total initial emoluments about Rs. 1175 p.m.)

Note:

(a) Only suitable candidates will be called for interview.

(b) Other things being equal preference will be given to candidates from Scheduled Castes/Scheduled Tribes/Other Backward Communities.

(c) Higher starting salary may be considered in exceptional cases.

(d) Work specifications of Posts 1 and 2 be collected with the application forms.

(Smt.) Kamalini H. Bhansali
REGISTRAR

AMERICAN STUDIES RESEARCH CENTRE

HYDERABAD
requires

ASSISTANT LIBRARIAN

Salary in the pay scale Rs. 1,100-50-1,600 and allowances as per Central Government.

Minimum of Master's degree in Library Science plus Master's degree in Humanities or Social Sciences (preferably with a paper in American Literature or History). Fluency in English and ability to write and correspond in English and typing skill are essential. Five years experience in academic or research library including two years experience in supervisory or other responsible position.

Knowledge of reference sources and bibliographic services such as preparation of annotated checklists and catalogs. For Technical Services, a thorough knowledge in Dewey Decimal Classification and Anglo-American Cataloging Rules and experience in cataloging is essential.

Should be able to determine work priorities, assign duties/projects and supervision of staff.

Candidates who have applied in response to our ad. in September 1978 need not apply.

Application on plain paper should reach the Director, American Studies Research Centre, Hyderabad 500007, not later than **12 May 1980.**

Candidates called for interview will be paid 1st class roundtrip trainfare.

Fiscal & Administrative Officer

ALL INDIA INSTITUTE OF MEDICAL SCIENCES

ANSARI NAGAR, NEW DELHI-110016

Advertisement No. 2/80-Estt. I

Applications will be received by the Director, All India Institute of Medical Sciences, Ansari Nagar, New Delhi from the Indian citizens upto the **16th May, 1980** for the post of Associate Professor of Ophthalmology for Dr. Rajendra Prasad Centre for Ophthalmic Sciences on the prescribed forms available on request.

Upper Age Limit : 50 year relaxable for Government servants, Schedule Castes and Scheduled Tribes candidates or otherwise exceptionally qualified candidates. Upper age limit upto 5 years is relaxable in the case of Schedule Castes and Scheduled Tribes candidates.

Application forms and detailed information sheet can be obtained personally or on written requests accompanied by a self addressed stamped (0.50 paise) envelope (23×8 c.m.)

UNIVERSITY NEWS, MAY 1, 1980. **Regd. No. R.N. 7180/62 Postal Regd. No. D(C)-534**

THE UNIVERSITY OF BURDWAN RAJBATI BURDWAN

WEST BENGAL

Advertisement No. 15/79-80
Dated, 8th April, 1980

Applications in the prescribed form are *invited for the following posts in* the approved scales of pay (viz. Reader-Rs. 1200-50-1300-60-1900/- and Lecturer—Rs. 700-40-1100-50-1600/-) with allowances and other benefits according *to University Rules. The monthly* honorarium for Part-time Lecturer is Rs. 150/- plus T.A. according to *rules*.

A. **Department of Mathematics**
   Lecturer: One post (lien bound but likely to be permanent)

B. **Department of Sanskrit**
   Reader : One post

C. **Department of English**
   Lecturer : One post

D. ***Department of Physics***
   (i) Lecturer : One post (Temporary)
   (ii) Lecturer : One post (lien bound but likely to be permanent)

E. **Department of Political Science**
   Lecturer : One post (lien bound but likely to be permanent)

F. **Department of Commerce** : (for *Post-graduate Diploma Course in* Industrial *Laws and Personnel* Management)
   Part-time Lecturer : One post.

Minimum Qualifications:

(a) A *doctor's degree or published* research work of an equally high standard, and

(b) Consistently good academic record with first or high Second Class (B in the seven point scale) Master's Degree in the relevant subjects or an equivalent degree *of a foreign University.*

Desirable Qualifications : Specialisation OR Proficiency :

For A : Algebra or Topology or Geometry or Analysis.

For B : Any branch of the subject.

For C : Linguistics/Stylistics/E. L. T. qualifications.

For D (i) : Experimental Nuclear Physics.

For D (ii) : M.Sc. in Physics with Radio Physics & Electronics or M. Tech. Radio Physics & Electronics. The candidate should also have the specialisation in communication systems/Non-linear Oscillations.

N.B. This was previously advertised vide No 12/79-80. Those who applied earlier need not apply again.

For E : Government and Administration of South Asian Countries.

For F : Candidate *must* have a post-graduate degree in Commerce or Business Management or Economics *and also degree in* Law. Preference will be given to a holder of Master's degree in Law. Candidate must be conversant with Labour Laws.

Experience :

Candidate should be a practising Lawyer in Labour Courts of at least 5 year's standing. Preference will be given to one *having experience in teaching* Labour Laws in a University or a recognised Institute of higher learning. Candidate selected will be required to deliver a minimum of three lectures per week.

*The University Council may on re*commendations of the appropriate Selection Committee, waive any of the requirements in view of the candidate's specialised knowledge in the subject. The choice of the Committee may not necessarily be confined to those who apply formally.

*For application form and other in*formation apply to the Registrar with a self-addressed stamped (0.40 p.) envelope *(9" x 4")*.

Last date for submission of applications with requisite fee of Rs. 5/- is May 10, 1980.

A.K. Chaudhuri
REGISTRAR

UNIVERSITY OF JABALPUR

JABALPUR

Advertisement No. **Estt./80/127**
***Dt. 2nd April,* 1980**

Applications are invited on the plain paper for the following posts. viz. :- -

1. Reader : One for Philosophy *in* the *scale of pay of* Rs. 1200-50-1300-60-1900.
2. *Lecturer : One for Sociology in the scale of pay of* Rs. 700-40-1100-50-1600.

Essential Minimum Qualifications :
For Reader:

(a) (i): A Doctor's degree or published work of an equivalent high standard; and

(b) (i): A 2nd Class Master's degree *in a relevant subject with at*least 50% marks (B in the seven point scale) or an equivalent degree of a foreign University; and

N.B. While taking into account the marks/grade, the marks/grade obtained in internal assessment, if any, shall be excluded.
(ii) Atleast 50% marks at the Bachelor's degree examination, *the basis of which division is* awarded at the degree level by the University; and
(iii) Atleast 50% marks at the Higher Secondary/Intermediate/Pre-University Examinations, as the case may be;

AND

(c) (i): The experience of teaching of post-graduate classes shall be atleast 5 years.
(ii) : Atleast three years experience *guiding research.*

For Lecturer:

(a) (i): A Doctor's Degree or published research work of an equivalent high standard: and

(b) (i): A *2nd Class Master's* degree in a relevant subject with atleast 50% marks (B in the seven point scale) or an equivalent Degree of a foreign University; and

N.B. : (While taking into account the marks/grade, the marks/grade, obtained in internal assessment, if any, shall be excluded).
(ii): Atleast 50% marks at the Bachelor's Degree examination on the basis of which division is awarded at the *Degree* level by the University, and
(iii): Atleast 50% marks at the *Higher Secondary Intermediate/* Pre-University Examination, as the case may be.

Having regard to the need for developing inter-disciplinary programmes. the *degree in (a) and (b) (i) above may* be in relevant subjects.

N.B. : 1. The requirement regarding minimum percentage of marks shall be relaxed upto 5% in case of scheduled caste/scheduled Tribe candidates.
2. The posts are temporary for *the present.*

Qualifications are relaxable in cases of candidates of exceptional merit, Names of eminent persons distinguished in scholarships who do not apply may also be considered for selection. The candidates in their applications should give details of their 'Specialization' *if any. Canvassing in any* form or on behalf of the candidates *will* be treated as *disqualification.*

The applications showing the details of qualifications stated above along with the information regarding the proof of date of birth and past experience accompanied with true copies of testi*monials and Postal Order for Rs. 10/-* in the name of the undersigned should reach here not later than **15th May,** 1980. The candidates already in employment at present should send their applications *through proper* channel.

R. N. Tripathi
REGISTRAR

SAURASHRTA UNIVERSITY

RAJKOT

CORRIGENDUM

"Reference advertisement dated *15 April '80 issue on page No. 223. For* the post of Professor-in-charge (English Language Cell) applications of persons upto 65 years of age will also be considered."

REGISTRAR

Printed & Published by ANJNI KUMAR, on behalf of the Association of Indian Universities (formerly known as Inter-University Board of India), Rouse Avenue, New Delhi - 110002 Grams : UNIBOARD. Phone : 276504 and 273037. Printed at NEW INDIA PRESS, NEW DELHI-1